JANUARY, 1955 CONTRACTORS' ISSUE

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PIPE LINE INDUSTRY

A Gulf Publishing Company

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CONSTRUCTION • OPERATIONS • MAINTENANCE

CONTRACTORS LOOK TO FUTURE

Page 38

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Ahead lies even greater possibilities"

G. Austin Manuel, President, Pipe Line Contractors Association

In 1954 . . .

- Pipe-laying methods continue to improve. Turn to Page 44 for some new ideas developed during past year.
- New technological advancements also reached the stage of practical application. Page 54.

In 1955 . . .

- 1954 was a good year. 1955 promises to be even better. PLI's pipe line predictions Page 40.
- The gas industry is predicting record highs. Some $1 billion will be spent on expansion. Page 58.
- Will the Natural Gas Act be amended? The chances are good. But the fight will be epochal. Page 76.

Turn page for additional contents and a Quick Review of this issue

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PIPE LINE PROGRESS

298 MILES OF A. O. SMITH LINE PIPE

helps Service Pipe Line transport "crude" from the Rockies

Service Pipe Line Company now provides a new outlet for Rocky Mountain and Williston Basin Production. Starting at Fort Laramie, Wyoming, the line traverses the southeastern part of the state, Southwestern Nebraska, Northeastern Colorado and the State of Kansas, with a small segment in Western Missouri which connects with Service Pipe Line Company's main North-South system. The initial capacity of the line is to be 160,000 barrels a day. Eventually capacity will reach 200,000 barrels.

It will transport crude oil produced in Wyoming and other sections of the Rocky Mountain area, the Denver-Julesburg Basin and the production of Western and West-central Kansas.

A. O. Smith supplied almost half the 628 mile line — a total of 298 miles in 20 inch and 22 inch diameters. To meet Service Pipe Line's schedules, this pipe was shipped simultaneously from both A. O. Smith Corporation at Milwaukee and A. O. Smith Corporation of Texas.

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PIPE LINE INDUSTRY

CONTENTS and Quick Review

35

January, 1955 Vol. 2, No. 1

To help you put first things first, scan these time-saving digests, checking ☑ those you want to read first.

Contractors Association Accomplishes Much

☐ A review of past progress and a look at what the future holds for the Pipe Line Contractors Association.

By G. Austin Manuel.....Page 38

Contractors Meet in Los Angeles

☐ The annual convention of the Pipe Line Contractors Association moves out of the Southwest for the first time. This year it's in Los Angeles.

Page 39

Forecast for '55: Big Year Ahead

☐ Almost 18,000 miles of new pipe lines four inches and larger was constructed in the U. S. last year. And this year's construction promises to be at least 12 percent greater.

By Donald M. Taylor.....Page 40

New Ideas in Pipe Line Construction

☐ Year after year new ideas are developed in pipe line construction. And 1954 was no exception. PLI has compiled some of the highlights that contributed to the booming 1954 record.

By Donald M. Taylor.....Page 44

New Technical Developments in 1954

☐ The past year saw many new ideas conceived for technological improvements in pipelining. And many ideas—some months old, some years old—developed into practical application. Eight ideas are listed which reached the stage of proven use during 1954.

Page 54

Gas Industry Looks to Record Highs

☐ Approximately $4 billion will be spent during 1954-1957 inclusive. In the next 12 months, the industry plans to spend approximately $1 billion on new lines, etc. The president of the American Gas Association points out what's ahead.

By F. M. Banks.....Page 58

Automation Is Coming!

☐ Here's a look at the automatic measuring, sampling and testing equipment in use today and a preview of the automatic devices yet to come.

Page 61

New Pipe-Laying Record Set

☐ Service Pipe Line Company set an all-time world's record for laying large-diameter pipe when the final weld on its 625-mile Wyoming-Missouri line was completed November 15. This was 61 days after right-of-way clearance started on September 16.

By Carl Huss.....Page 66

540-Mile Yellowstone Line Completed

☐ The Yellowstone Pipe Line System is in operation. This line runs through some of the most rugged country in the U. S. to carry products to Spokane, Wash. Here's the story of a line that required 35 river crossings.

Page 72

Chances Good of Amending Gas Act

☐ Legislation vital to industry will be introduced soon in the new Congress. Will the Natural Gas Act be amended? The chances are good. But the fight will be epochal. In the Upper House, the balance of power will rest with 41 uncommitted senators. The outlook in the House is vague at the best. Don't miss this on-the-spot analysis of one of the most critical legislative struggles ever faced by our industry.

Page 76

Who's Meeting Where 20
Rules of Thumb for the Pipeliner's Notebook 43
You Asked About Corrosion ..... *Marshall E. Parker* 53
How to Do It—Pipe Line Hints 82
What's Happening in Pipe Line Construction 90
PIPE LINE INDUSTRY's Views of the News 94
Pipe Line Men in the News 98
What's Happening Among Service and Supply Men 104
What's New in Equipment 108
New Literature 111
ADVERTISERS' INDEX 112

. . . plus PLI's first editorial index

When did PLI publish the article about the "misbehaving bridge"? When did PLI carry a Hint showing how to use a pickup truck to start large engines? Who's the writer who answers questions about corrosion in each issue?

Questions such as these can be answered quickly by referring to the first annual Editorial Index, included in this issue. It's inserted on the blue paper between Pages 80 and 81. It covers all issues published in the last six months of 1954. A limited number of additional copies of this index are available by writing the Librarian, Gulf Publishing Company, Box 2608, Houston 1, Texas.

PIPE LINE INDUSTRY published every month. Entered as second class mail matter July 9, 1954, at the post office at Houston, Texas, under the act of March 3, 1879.

Imports Need Calm Study

Increasing oil imports into the United States is a question fraught with the gravest possibilities. It easily could prove the rock on which the domestic oil industry, that of majors and lesser companies alike, could be seriously damaged.

The situation calls for restraint and the use of sound common sense on the part of both sides—for the sake of the interests of both and of the country as a whole. At the same time it does not call for a passive attitude.

Imports—reasonable imports—are necessary. Let there be no mistake about that by the purely domestic producers. They are necessary to provide the ultimate customers of our country with petroleum products at reasonable prices and to allow us to produce our oil with full regard to conservation and the greatest ultimate recovery of our oil.

That such a program has as a by-product a reasonable financial return to the producer of domestic oil is to the interest not only of the domestic producer—among whose ranks we also find the importers of oil, but to the people of the U. S. who are the buyers of petroleum products, and who make the oil industry possible.

For it *is* to the interest of these Americans who buy gasoline, lube, heating oils, etc., to have a sound domestic industry *not* subject to the whims of foreign countries or potentates.

In this connection, we can compliment *most* of the countries from which oil comes to this country—but we have in mind three specific instances where foreign governments decided that they would take over the oil they had contracted to oil companies. The U. S. must have a strong oil industry for economic reasons and for the highly important reason of national defense.

Had the U. S. not had a strong domestic oil industry during World War II, we conceivably might have lost it—and certainly under a poor domestic supply the war would not have terminated as early as it did. Petroleum products constituted two-thirds of the dead weight of munitions, food supplies, etc., moved to the fronts in World War II.

•

In the states which produce most of the U. S. domestic oil, conservation measures and orders have forced the daily allowable production from oil wells down to the point where further reduction will be financially ruinous, many producers will fail and the industry become weak. One does not have to own oil wells or interests in them to see that excessive oil imports will bring this about fairly quickly.

Further, it seems to us that it takes a very short-sighted executive not to realize that increased importations, should they break down the economic structure of the domestic oil producing business, will crack wide open the domestic markets for refined oils of the oil companies, *big* and little. And if any buyer of petroleum products thinks that a major market in these U. S. can be cracked without serious damage to all others, he should have his head examined. We should hate to be the oil company executive or executives responsible for the start of a depression!

Somewhere there must be a point of balance between domestic production and imports which results in a situation desirable to national defense, the consumer, the domestic producer with no oil to import and the importers. We admit that we do not know exactly where that point is—though we believe it can be determined.

But we do believe, and we think that present facts determine that we have not given expression to a paradox that imports have already passed the mutually desirable point—and that the anticipated "inevitable" increase in imports about which we have been hearing, will prove ruinous.

The whole picture requires calm study by all involved. Domestic producers, who do not feel that they should assume in whole or part the burden of a return of Iranian oil to world markets might well ask themselves as to the effect on world oil markets of the dumping of Iranian oil by Russia if it should fall into their hands.

•

States, whose revenues have been hurt by curtailed oil production, should remind themselves that Iran, too, was in desperate straits—and had to regain its oil revenues—and these states might well remind themselves, too, of the ruinous effect of the dumping of the million barrels of oil a day easily available *without additional drilling* in Iran.

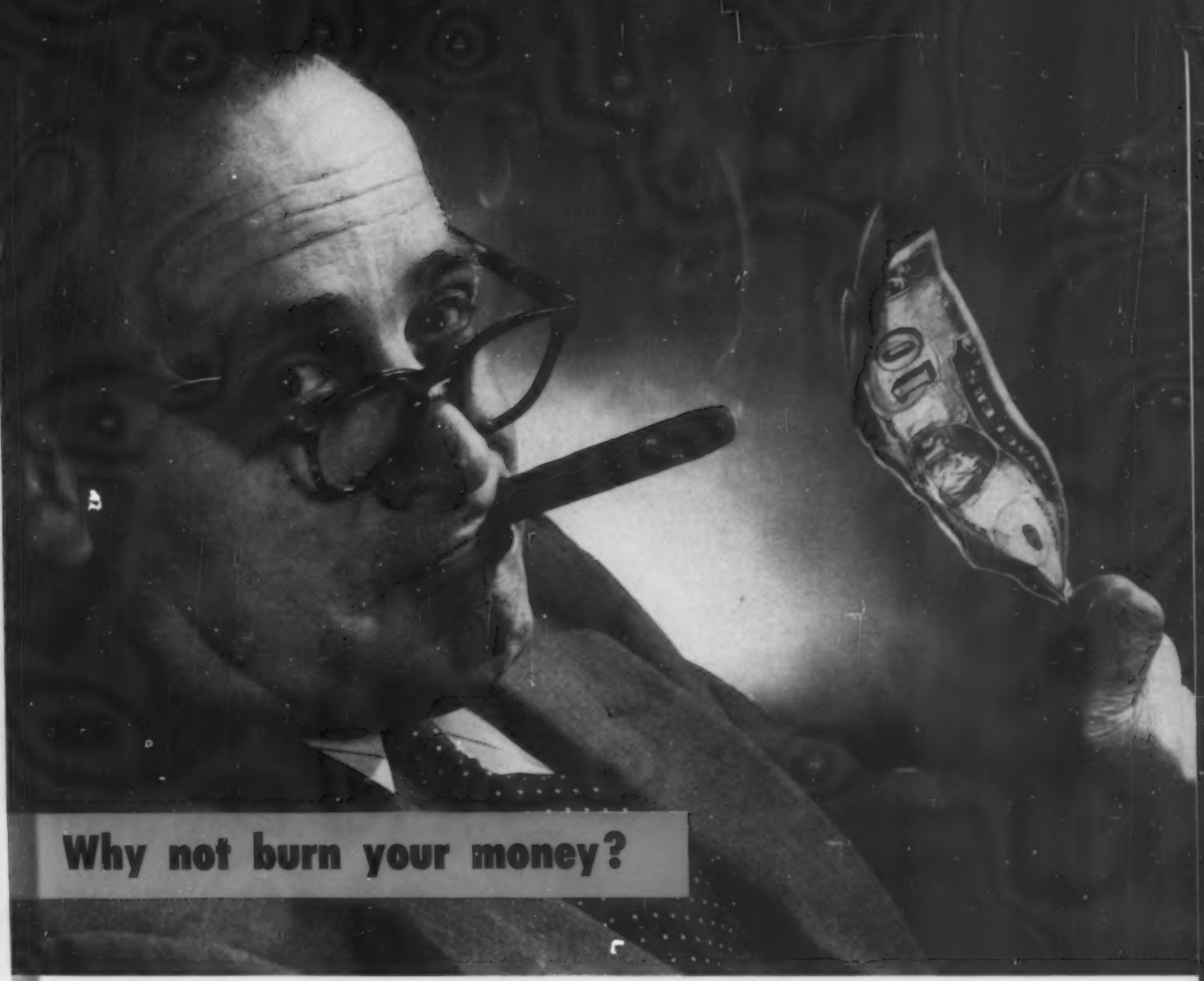
But the importers, who have been rightfully concerned about the situation existing in Iran, should remember that from a tax standpoint oil producing states, too, have a vested interest in the oil produced within their borders, and that in addition to independent oil producers, there is a vast army of royalty owners and stockholders of big and little companies who are concerned that the American oil industry continue to be a free enterprise, managed, big and little, by men who can see beyond their noses.

To the independent producers who are rightly exercised by the import situation, we would like to make the reminder that more can be accomplished by reason than by recrimination. A tariff would help, but to ask for something unreasonable will only hurt the cause. Already the public, or much of it, thinks all oil men "fabulously" rich.

Unfortunately leaders of the independents and importers cannot meet and discuss this problem which involves all Americans—and the U. S. of America as well. To do so would be to invite Federal prosecution.

If we have one suggestion to make it is that the state regulatory bodies would do well to put their most earnest, non-political efforts to this question and that they remember that the various aspects of the matter will change from year to year.

Ray L. Dudley



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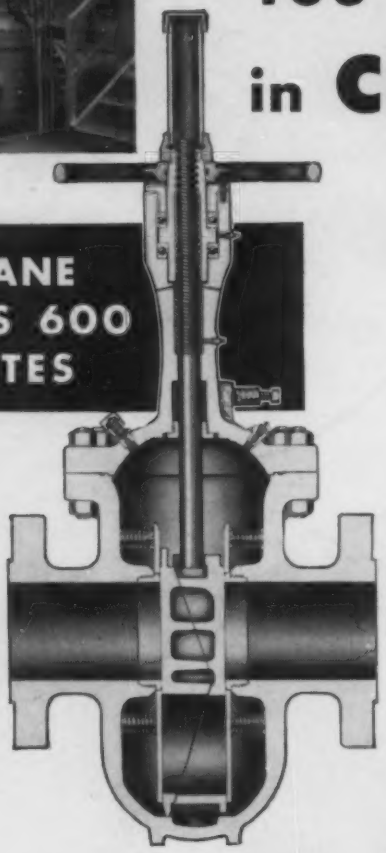

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for instance...

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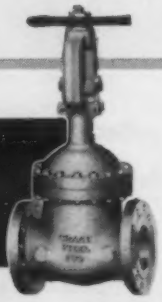

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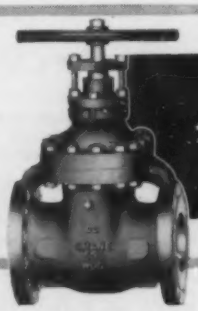

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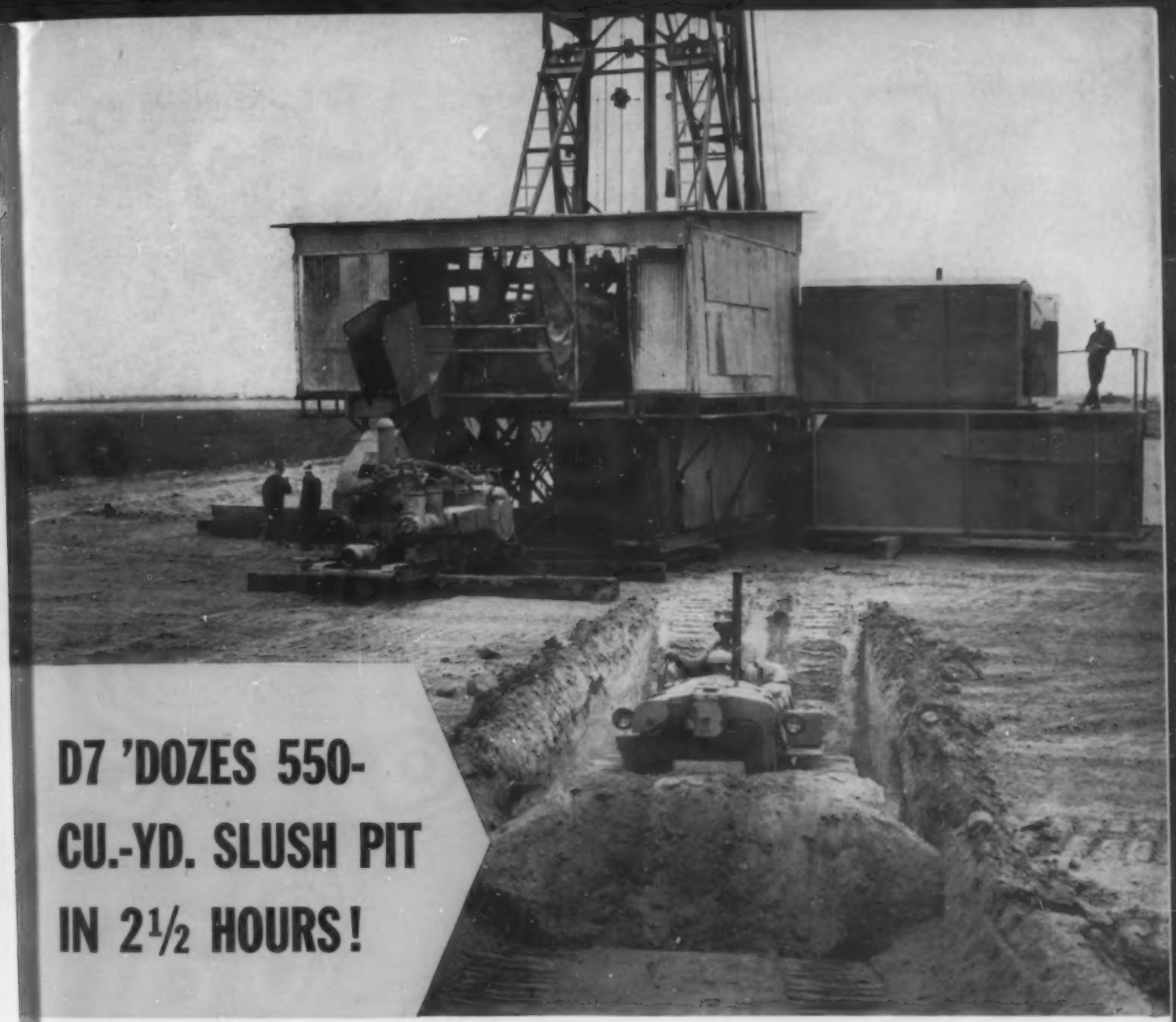

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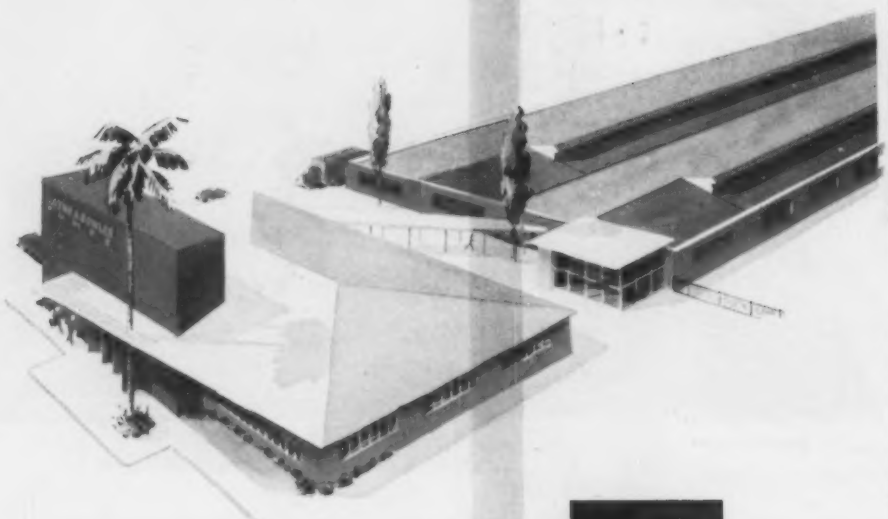

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THE Little Boomer

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MIDWESTERN

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- FLEXIBLE
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- EASY TO OPERATE

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This hydraulic sideboom can be furnished for your crawler tractor regardless of size or make. For more information write . . .

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TRACTOR:	
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Speeds: First MPH	2.01
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Third	5.24
Reverse	2.33
SIDE-BOOM:	
Drums	standard winch
Cables	5/16"
Height	84"
Length	101"
Width	66"
Boom length	10'

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15 S. W. 29th St. — Oklahoma City, Oklahoma

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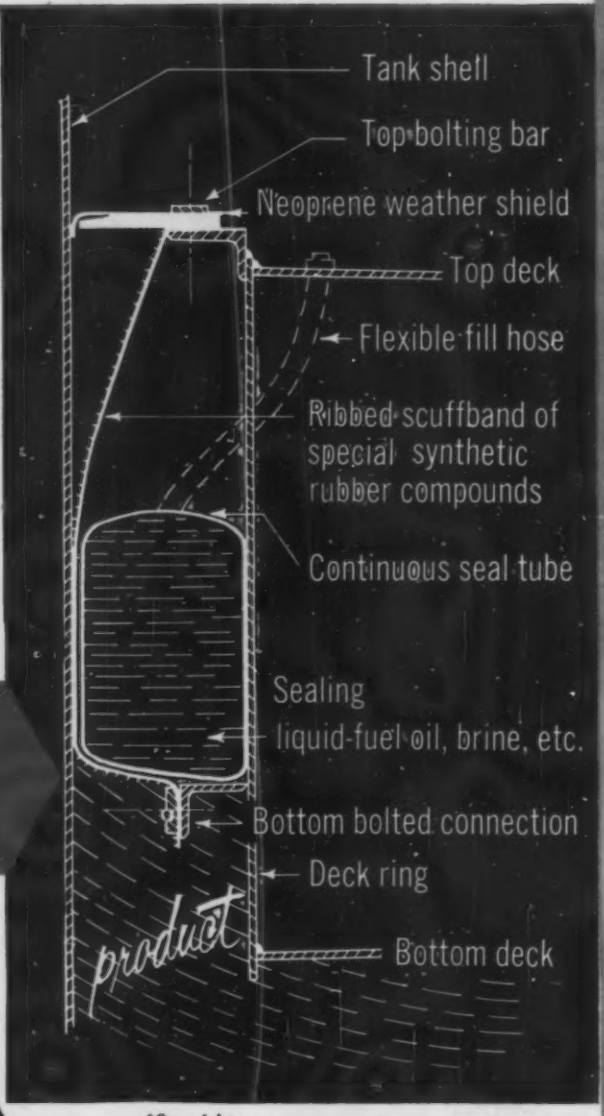

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Sales Offices: NEW YORK 20 • AKRON • BOSTON 10 • BUFFALO 2 • CHICAGO 3 • CINCINNATI 2 • CLEVELAND 15 EL PASO • EUSTIS, FLA. • HOUSTON 2 • LOS ANGELES 14 • PITTSBURGH 19 • RICHMOND 20 • SAN FRANCISCO WASHINGTON 6, D.C. • HAVANA • MEXICO CITY • "TIPSA" BUENOS AIRES **Licensee in Cal.:** LACY MFG. CO., LOS ANGELES

Now you can carry on a **conversation** in your **compressor station!**

SCENE: a compressor station.

PROBLEM: noise—objectionable, dangerous noise.

SOLUTION: ULTRACOUSTIC, a unique G-B material consisting of two different types of glass fiber blankets separated by a central, flexible septum.

RESULTS: The deafening noise level was reduced 50%! Now, with all engines running, conversation is possible. The installation was considered so successful that the company is now installing ULTRACOUSTIC in other compressor stations.

As the photos show, the technique employed was to apply ULTRACOUSTIC (48" wide, 3" thick) in continuous blanket strips between the wall girts and roof purlins. Light in weight, easy to cut, ULTRACOUSTIC is exceptionally easy and inexpensive to apply.

Throughout industry, ULTRACOUSTIC is being selected to handle the really tough acoustical problems. It absorbs more sound than any other acoustical insulation on the market today. No doubt about it — ULTRACOUSTIC is the "last word" in noise control!

WRITE TODAY FOR COMPLETE TECHNICAL DATA AND APPLICATION INFORMATION

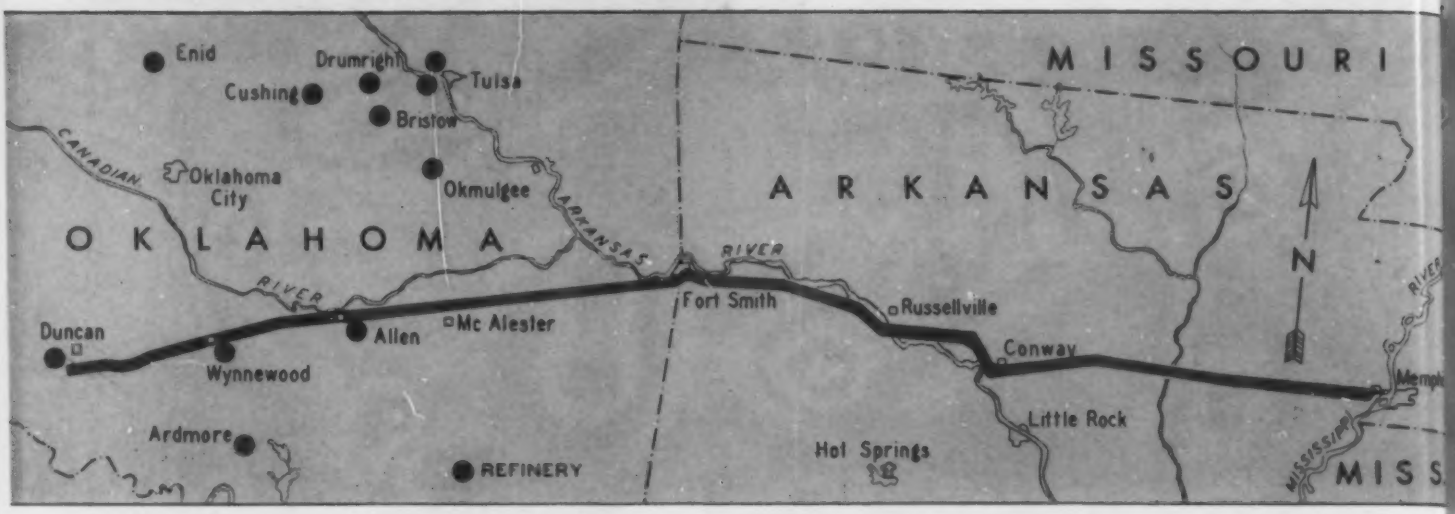
By insulating exhausts, ceiling and portions of the walls, a pipe line company reduced the noise level in this compressor station to the point where conversation is easy and operators perform their tasks more efficiently. Insulation used on ceiling (above) and walls (below) was ULTRACOUSTIC glass fiber insulation.

GUSTIN-BACON *Manufacturing Company* **gb**

Thermal and acoustical insulations • Molded glass fiber pipe insulation • Pipe couplings and fittings

278 W. 10TH ST., KANSAS CITY, MO.

NATIONAL SEAMLESS USED FOR ANOTHER TOUGH JOB...



475-mile Pipeline Opens New Market Area
FOR OKLAHOMA REFINERIES

Through wooded hills . . .

across flat fields of blooming cotton . . .

and through the sandy bed of the dammed-up Arkansas River

● Approximately 34,000 tons of 12¾" O.D. National Seamless Steel Pipe were used in the construction of the 475-mile oil products pipeline for Oklahoma Mississippi River Products Line, Inc. Originating at Duncan, Oklahoma, the line runs eastward, across Oklahoma and Arkansas, to its destination at West Memphis, Arkansas. USS National Seamless Pipe was used in that section between Allen, Oklahoma and West Memphis—shown in red on the map.

The pipeline opens a large, new market area to the east for Oklahoma refineries, terminating on the west bank of the Mississippi where low cost water transportation up the Mississippi and Ohio rivers is available.

Construction of the line was started in November of 1953 and was completed in June 1954. It has an initial capacity of about 40,000 bbl. per day, operating with pump stations at Duncan, Wynnewood, and Allen, Oklahoma, and Conway, Arkansas.

As is often the case when an unusually tough job comes along—and cross-country pipelines are among the toughest—the engineers turned to National Seamless Pipe for the necessary combination of high strength, extreme flexibility, and complete uniformity that only *seamless* can give. They needed pipe that would resist great pressures, would absorb distorting and bending stresses; pipe that possessed superior welding characteristics; pipe that could be depended upon to give uninterrupted and satisfactory service for years to come. In National Seamless, they knew from long experience that they had all of these qualities, and more—the reputation and know-how of National Tube, world's largest producer of tubular steel products.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL

STAYNEW FILTERS' DOUBLE ACTION

Guards Against Water, Oil and Pipe Scale

MECHANICAL SEPARATION

1. Deflector cup directs flow of air or gas together with water, oil and dirt to the walls of the housing and then downward at high velocity into the base where liquid and heavier dirt particles are deposited.

FILTRATION

2. Air or gas, having been mechanically cleaned, rises at low velocity through the Radial Finned Filtering element or insert which removes the lighter air-borne material.

MODEL CPH
PIPE LINE FILTER

This exclusive Double-Action principle of Staynew Pipe Line Filters assures sustained, trouble-free operation. Inexpensive, quickly installed and easily maintained, these filters keep air operated or controlled equipment free from pipe scale, dust, dirt, and condensate. Wherever you require air and other gases *clean* and *dry*—demand and get—Staynew Pipe Line Filters.

Write today for complete Staynew Pipe Line Filter Bulletin B-1A.

Representatives in Principal Cities

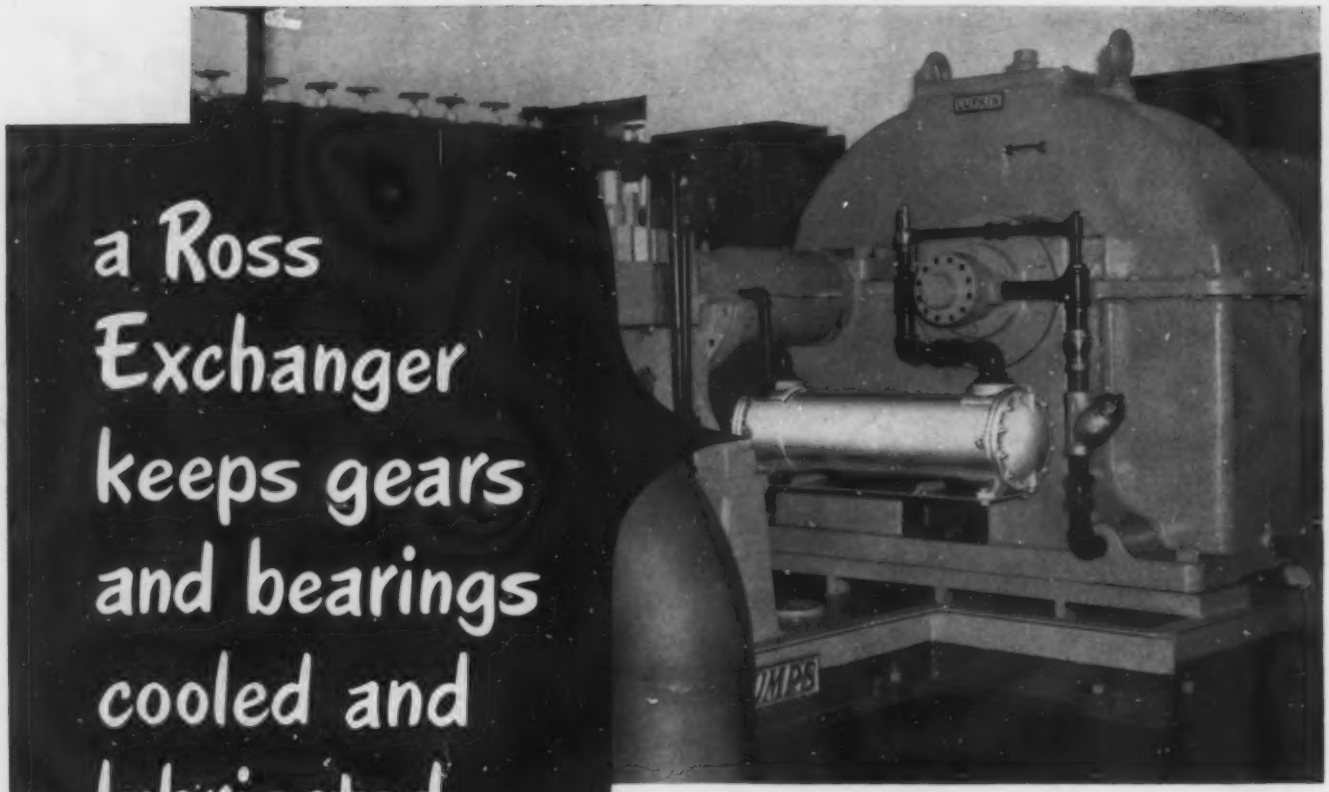
DOLLINGER PROTECTOMOTOR STAYNEW FILTERS

DOLLINGER CORPORATION

95 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

For more data on advertised products, use Readers' Service Cards, last page.



a Ross Exchanger keeps gears and bearings cooled and lubricated

in this Lufkin high speed increaser

Under the high speeds and peak loads of pipe line pump station service . . . precision gears and bearings in this Lufkin Type N High Speed Increaser not only *need* adequate lubrication and cooling . . . *they depend on both!*

. . . *and they get both!* Lufkin Foundry and Machine Company furnishes a Ross Type BCF Exchanger. "A most vital part of the cooling system," says Lufkin. By controlling the oil temperature in this way, not only is viscosity maintained for adequate lubrication of gears and bearings, but they are properly cooled as well.

Why Ross Exchangers?

Here's what Lufkin's Engineering Department has to say:

"We wanted a quality exchanger that we could install and forget."

"Our unit required a large capacity exchanger for a small, compact space . . . without altering the design of the unit."

"Since we have 33 sizes of Type N units, we needed to have many different sizes of exchangers."

"Very often the customer has to use salt water or sour crude as a cooling liquid."

"The pressure of the cooling liquid sometimes becomes excessive for most exchangers."

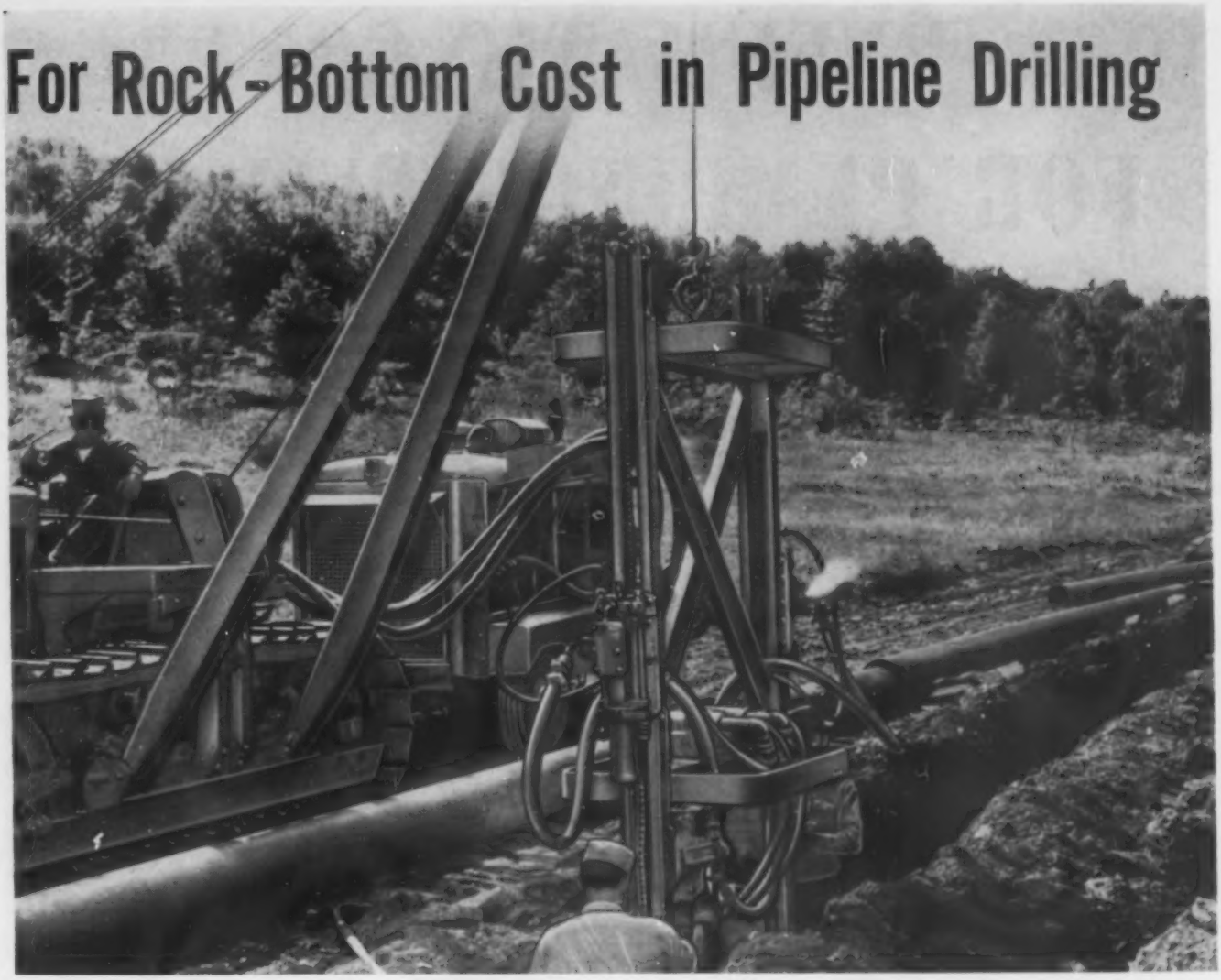
Throughout industry, other top-name machinery manufacturers, like Lufkin, list equally specific reasons for standardizing on Ross Type BCF Exchangers. They prefer the pre-engineered, completely standardized designs; the all-copper and copper alloy construction and the wide range of sizes to meet all conditions.

More details on the rugged dependable Ross Type BCF Exchanger are in Bulletin 1.1K5. Write for your copy.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1450 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

For Rock-Bottom Cost in Pipeline Drilling



use Ingersoll-Rand's

"dual-drill" RIG

For maximum all-around efficiency,
you can't beat this complete I-R team:

- **I-R PLM-2 "DUAL-DRILL" RIG**
- **I-R CARSET JACKBITS**
- **I-R GYRO-FLO 600 COMPRESSOR**

The Ingersoll-Rand "Dual-Drill" Rig is especially designed to permit faster, easier, and lower-cost pipeline drilling. With CARSET JACKBITS, operators drill two holes at a time, with no change of steel and practically no bit changes. Drilling time per hole is considerably reduced and the move to the next position is made in less than a minute.

The I-R "Dual-Drill" Rig utilizes the famous Ingersoll-Rand X71-WD Rock Drills proven for their excellent performance on wagon drills the world over. The Rig comes complete with controls, hose and lubricators on a rugged fabricated steel mounting. Control valves for drill feed, hammer action and hole blowing are at the operator's fingertips, conveniently located on the I-R air-feed motor. Simply hang the rig on your "boom cat", attach the air connections, and you're ready to go.

This "Dual-Drill" Rig, powered by an Ingersoll-Rand Gyro-Flo 600 Compressor and equipped with faster-drilling, longer-lasting Carset Jackbits, gives you a fast-moving combination that pays off many times in reduced cost per foot of trench.

Your nearest I-R representative will be glad to give you the complete story.

5-144

Ingersoll-Rand
11 Broadway, New York 4, N. Y.

For more data on advertised products, use Readers' Service Cards, last page.

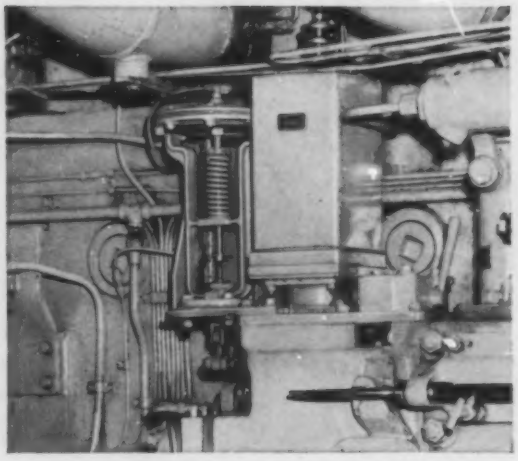
100% PNEUMATIC CONTROL FOR PUMPING STATIONS

DRAWING below shows how a well-known Midwestern Pipeline Company controls suction and discharge pressures as well as engine speed pneumatically, with fully automatic Taylor control. Here's why this system was chosen:

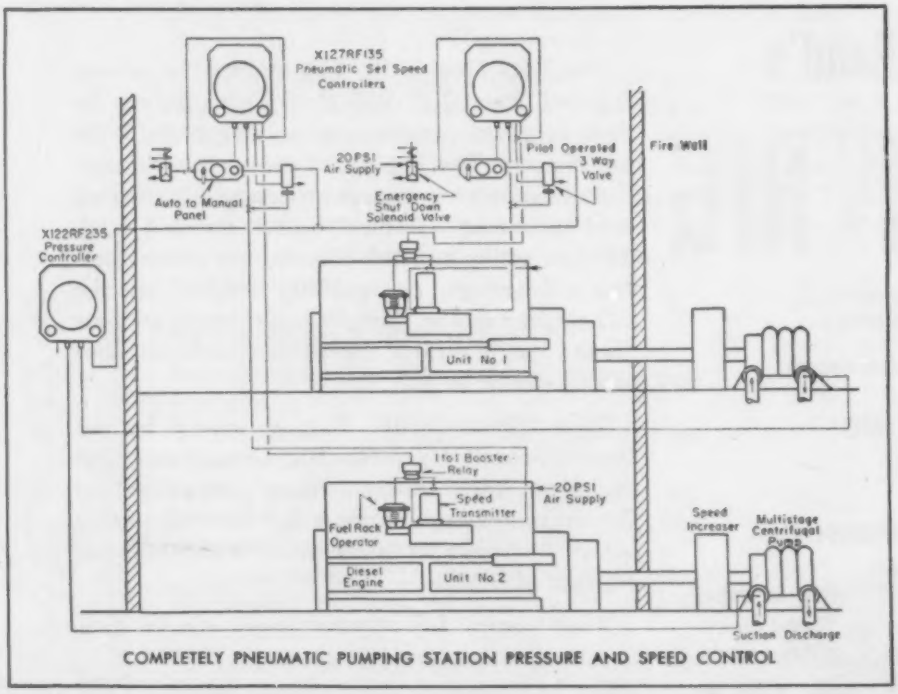
1. High accuracy and rapid response to load changes.
2. Simplicity and dependability of FULSCOPE* control proven in over 15 years of use.
3. Easy to set up and adjust for optimum station performance.
4. Maintenance costs are cut to the bone, since station pressure controllers and speed controllers are same basic instruments.
5. Continuous record of engine speed is available at all times.

Have you a pumping station problem? Call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Reg. U.S. Pat. Off.



Close-up view of Taylor Speed Transmitter and pneumatically-operated fuel rack. Speed sensing transmitter converts engine RPM into pneumatic signal which actuates recording speed controller.

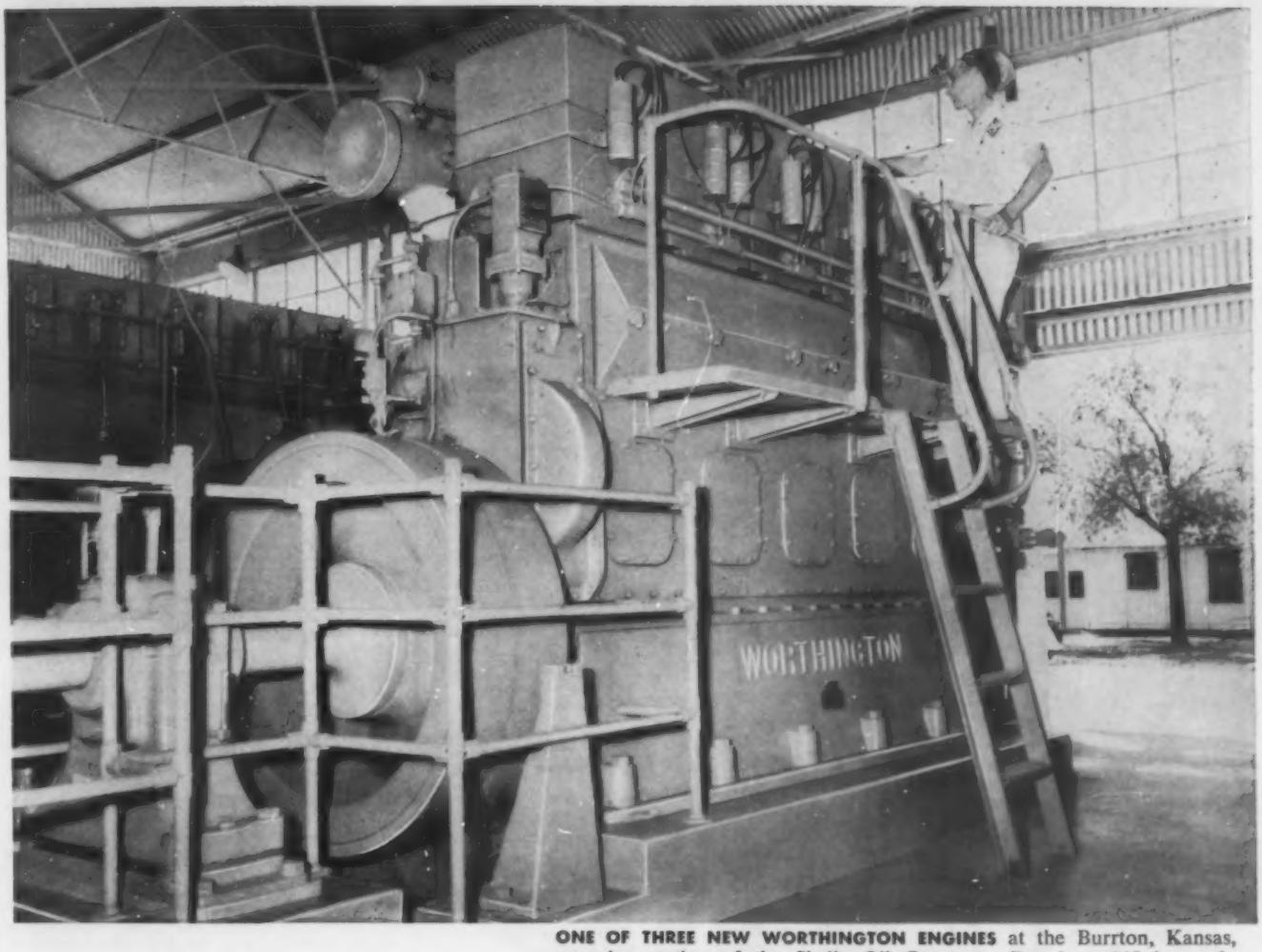


COMPLETELY PNEUMATIC PUMPING STATION PRESSURE AND SPEED CONTROL

STATION suction and discharge pressures are controlled and recorded by master controller in main control room. Pressures are set at their limits, and control is at the value dictated by existing pumping conditions. Output of this master controller pneumatically adjusts speed of two diesel engines to maintain constant suction—or discharge—pressure. Pneumatic-set speed controllers position the fuel rack to maintain the required speed.

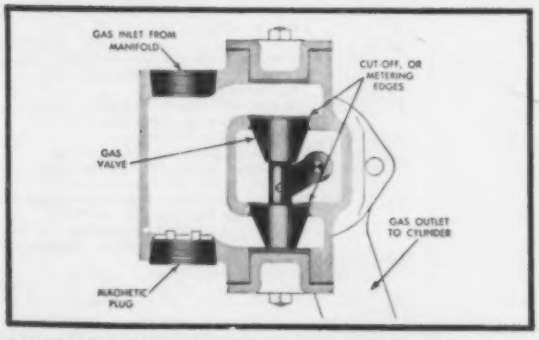
The speed control system consists of a pneumatic speed transmitter which converts diesel engine RPM into an output air signal going to a recording speed controller. Speed controller output goes through a booster to the pneumatically operated fuel rack positioner to provide fast action in the event of sudden load changes. Automatic to manual units assist in start-up of individual engines, which are started up on manual and then switched over to adjustment by the master controller.

Taylor Instruments MEAN ACCURACY FIRST



ONE OF THREE NEW WORTHINGTON ENGINES at the Burrton, Kansas, pumping station of the Skelly Oil Company. Rated at 445 hp each, these engines drive centrifugal pumps through step-up gears.

Skelly Oil buys three more Worthington engines



MICRO-METERING GAS VALVES used on all Worthington spark-ignition and dual-fuel engines assure equal cylinder loading, smooth running at all loads, better speed regulation, and lower maintenance.

You find out a lot about the performance of engines when you live with them 16 years.

Skelly Oil Company had that long to assess two Worthington gas engines installed in 1936 in their old pumping station at Burrton, Kansas. Driving centrifugal pumps through step-up gears, the Worthingtons did a fine job in moving crude oil 52 miles to the Skelly refinery in El Dorado. So when the time came to rebuild the Burrton Station with enlarged capacity, Worthington engines again received the nod from Skelly engineers.

Repeat business like this isn't exactly a surprise to Worthington. But it's still good to know that our old customers — people who have given our engines a real workout for years — keep coming back to us for additional equipment. Let us help with *your* power problems — write Worthington Corporation, Engine Division, Section E.4.6, Buffalo, New York. E.4.6

SEE the Worthington Corporation Exhibit in New York City. A lively, informative display of product developments for industry, business and the home. Park Avenue and 41st Street.

WORTHINGTON

Economical, Continuous Power — Diesel, Dual-Fuel and Spark-Ignition Engines, from 200 to 5000 bhp.

Why

do most users

prefer and buy the genuine

RIDGID

PIPE WRENCH?

It's easiest to work with... perfect balance . . . comfort-grip I-beam handle . . . handy pipe scale on hookjaw . . . easy-spinning adjusting nut . . . clean grip on pipe, no slip or lock.

It lasts longer... first guaranteed housing won't break or bind . . . ever. Every wrench individually tested before shipment . . . and millions of them in use. Sizes 6" to 60"—end pattern, 6" to 36".

For the most for your money, buy RIDGID . . . Your local Supply House stocks them for you, delivers them fast!

THE RIDGE TOOL COMPANY • ELYRIA, OHIO, U. S. A.

RIDGID

Work-Saver Pipe Tools

WHO'S MEETING WHERE

1955 JAN. 17–19	Annual Convention, Pipe Line Contractors Association, Statler Hotel, Los Angeles.
18	NEGA Operating Division, Hotel Statler, Boston.
20–21	Houston Section, National Association of Corrosion Engineers Short Course, University of Houston.
21	SGA Employee Relations Roundtable, Nashville.
26–28	Instrumentation for the Process Industries Symposium, Texas A&M College, College Station, Texas.
27–28	American Chemical Society, Symposium on Hydrocarbon Chemistry, Rice Hotel, Houston.
28	SGA Accident Prevention Roundtable, Heidelberg Hotel, Jackson, Miss.
FEB. 13–17	American Institute of Mining and Metallurgical Engineers, Conrad Hilton Hotel, Chicago.
13–18	A.S.T.M. Committee D-2 on Petroleum Products and Lubricants Rice Hotel, Houston.
16–18	National Association of Corrosion Engineers, Sixth Annual Short Course for Pipeliners, Mayo Hotel, Tulsa.
25	National Gasoline Association of America, Permian Basin Regional Meeting, Scharbauer Hotel, Midland, Texas.
MAR. 4	Southern Gas Association, Transmission Management Conference, Shamrock Hotel, Houston.
7– 9	Mid-West Gas Association, St. Paul Hotel, St. Paul, Minn.
7–11	National Association of Corrosion Engineers, Palmer House, Chicago.
23–24	Pacific Coast Gas Association Accident Prevention Conference, Santa Barbara.
24–25	American Gas Association, Gas Supply, Transmission and Storage Conference, Wm. Penn. Hotel, Pittsburgh.
24–25	NEGA Annual Meeting Hotel Statler, Boston.
APRIL 5– 7	Corrosion Control Short Course, University of Oklahoma, Norman.
12–15	American Gas Association Distribution, Motor Vehicles and Corrosion Conference, Netherland Plaza, Cincinnati.
18–19	AGA Residential Gas Section, Eastern Natural Gas Regional Sales Conference, Hotel William Penn, Pittsburgh.
19–21	Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.
20–22	Indiana Gas Association Annual Meeting, French Lick Springs Hotel, French Lick, Ind.
20–22	Petroleum Industry Electrical Association and Petroleum Electric Supply Association, Joint Conference and Exhibit Show, Shamrock Hotel, Houston.

PIPE LINE CONTRACTORS ASSOCIATION—7TH ANNUAL CONVENTION STATLER HOTEL, LOS ANGELES, CALIFORNIA—JANUARY 16-19, 1955

SUNDAY, JANUARY 16

10 a.m. Breakfast—Golden State Room, by invitation only, courtesy Caterpillar Tractor Company.

2 p.m. Pro Bowl Football Game—Los Angeles Coliseum, (for those planning to attend).

6 p.m. Special party for regular and special members and their wives—cocktails in

the Los Angeles Room, followed by dinner at 7:30 p.m. in the Golden State Room.

MONDAY, JANUARY 17

9 a.m. Registration—Ball Room Lounge. Fee—$20.

10 a.m. Meeting of Board of Directors—New York Room.

10 a.m. For the ladies—Special tour by buses, including lunch at Eaton's, courtesy Allis-Chalmers Manufacturing Company.

11 a.m. General Meeting—Golden State Room.

1. Welcoming Address—G. A. Manuel, president.
2. Report to the members—Richard A. Gump, executive secretary.

12 Noon. Luncheon for Contractors—Sierra Room, courtesy M. J. Crose Manufacturing Company, Inc., Pipeline Supply Company, Crose Equipment Company, and Crose-Curran, Ltd.

2 p.m. General Meeting—Golden State Room.

1. "Canadian Laws and Regulations Affecting Pipe Line Contractors"—R. A. MacKimmie, partner, Allen, MacKimmie, Matthews & Wood, Calgary, Alberta.
2. "Construction Methods on 36-inch Pipe"—Raymond H. Crowe, chief engineer, Transcontinental Gas Pipe Line Corp., Houston, Texas, and John Gay, Associated Pipe Line Contractors, Houston, Texas.
3. "Code for Pressure Piping"—Frederic A. Hough, chairman of Subcommittee 8 of American Standards Association, Bechtel Corp., San Francisco, Calif.

6 p.m. For the ladies—Hawaiian party with cocktails in the Los Angeles Room, followed by dinner at 7.30 p.m. in the Golden State Room.

6 p.m. Special party for contractors, courtesy Caterpillar Tractor Company; Sierra Room for cocktails, 6:00 to 7:30; Pacific Room for buffet, 7:30 p.m.

TUESDAY, JANUARY 18

10 a.m. General Meeting—Golden State Room.

1. Call to Order—G. A. Manuel, president, presiding.
2. "Outlook for Pipelining in Canada"—N. E. Tanner, president, Trans-Canada Pipe Lines, Ltd., Calgary, Alberta.
3. "Fundamentals of Safety in Pipe Line Construction,"—Bennie G. Pierce, safety director, H. C. Price Company, Bartlesville, Okla.
4. "The Association's Safety Program"—John H. Williams, president, Williams Brothers Company, Tulsa, Okla.

12 Noon. Luncheon and fashion show for men and women—Pacific Ball Room.

2 p.m. Business Meeting and election of officers—regular and special members only, Los Angeles Room.

6 p.m. Cocktail Party for all guests—Assembly Room, courtesy International Harvester Company.

7:30 p.m. Annual banquet and floor show—Pacific and Sierra Rooms.

WEDNESDAY, JANUARY 19

10 a.m. Special meeting all day—Los Angeles Room, regular and special members only. Discussion of labor agreements, presided over by Labor Committee, C. C. Bledsoe, Chairman.

where endurance is a must...

For "long-run" use, the *Standardaire* Blower has proved its ability to move more gas with less wear and less maintenance and power costs than other blowers of equal weight and size.

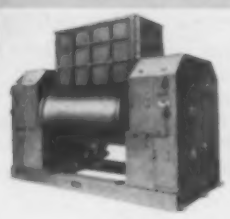
You'll find the *Standardaire* Blower offers you a wider range of pressures with a minimum of internal losses. This dependability of operation is achieved by employing a proved principle of compressing gas on a modified adiabatic cycle. The high pressure gases are confined to the discharge end of the blower, because of the continuous sealing throughout the entire length of the *Standardaire's* accurately machined rotors.

Write today for the new bulletin on *Standardaire* Blowers.

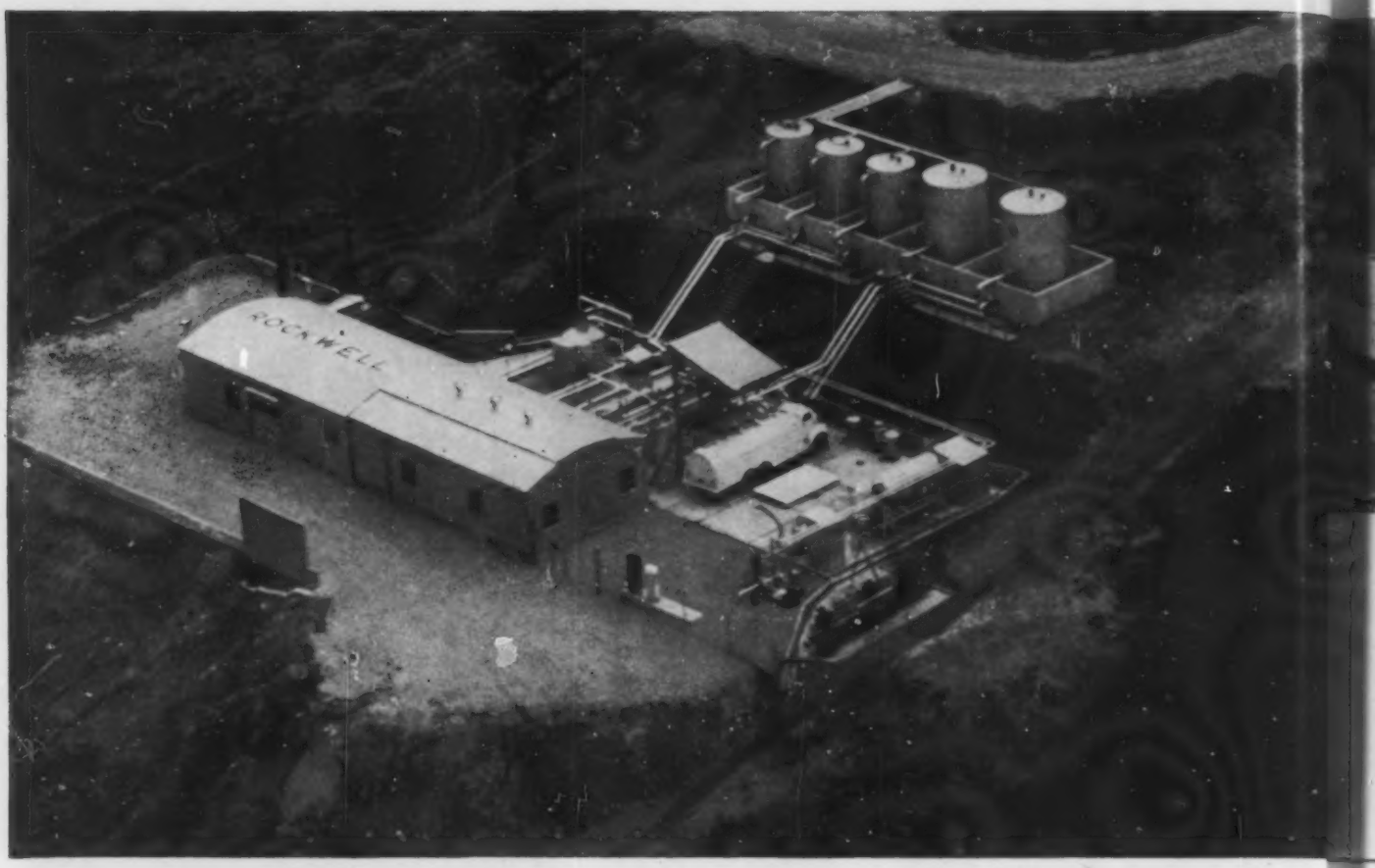
READ STANDARD CORPORATION

BLOWER-STOKER DIVISION
370 Lexington Avenue
New York 17, New York

Read Standard also manufactures a complete line of chemical mixers for laboratory and industrial use. For information write, Read Standard Corp., York, Pa.



For more data on advertised products, use Readers' Service Cards, last page.

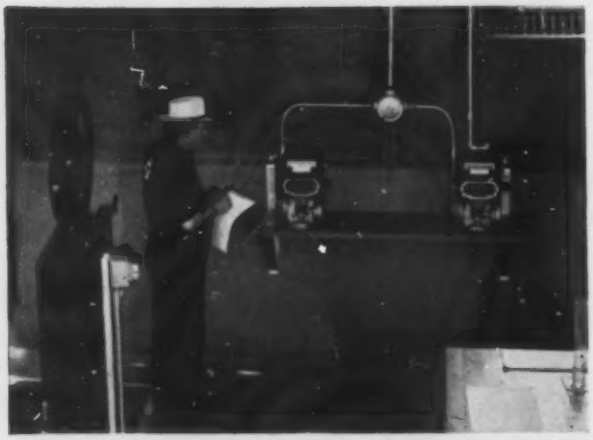


Aerial view of new Rockwell testing station containing every facility for petroleum meter proving, research and development.

Rockwell opens

world's largest meter

the only one of its kind . . . dedicated to better



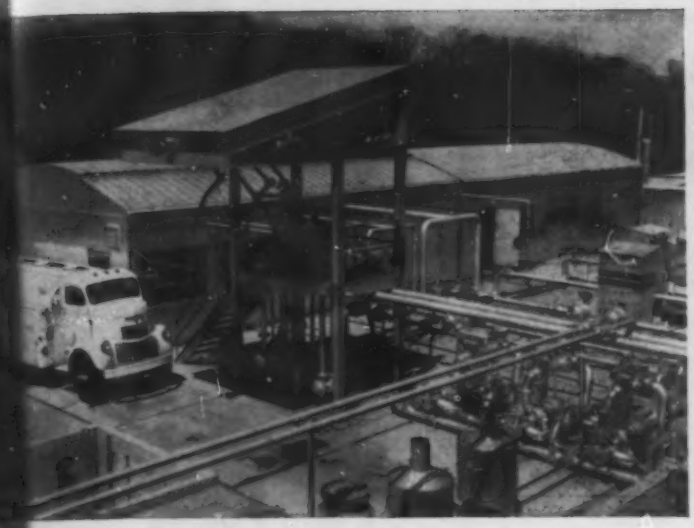
Mechanized Accounting This demonstration installation located at indoor test room is used as a proving ground for mechanized controlled accounting of liquid values through the use of meters, multiple carbon ticket printers, remote registration, automatic shut-offs and similar apparatus.

In This Unique Plant We Test Meters Under Every Conceivable Operating Condition—Shock Load and Abuse Them—Pre-Prove Their Accuracy and Performance.

Why? So you'll know in advance *and for sure* that Rockwell meters will precisely measure the liquids specified—will stand up under stresses and strains far above any normal expectancy.

In this new, completely equipped four acre plant Rockwell engineers can duplicate every field measurement condition; can exactingly test and torture meters under actual conditions of pressure, temperature and fluid viscosity.

This practice pays off in greater accuracy, longer meter life, less maintenance, and lowered measurement costs. That is why it will pay you to make Rockwell Rotocycle meters your preference and save money on every job.



Laboratory On Wheels Rockwell tank truck is about to be loaded at test station through Rotocycle meters fitted for remote registration. This truck is also used for actual road testing the performance of Rockwell tank truck meters. Underground volumetric prover tank is provided for testing truck meters by gravity or pump.

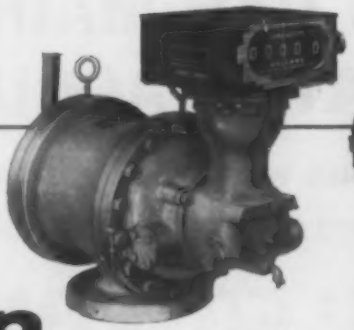
Five of a Different Kind Five storage tanks and multiple runs permit actually testing meters on gasoline, fuel oil, bunker "C," sweet crude and sour crude respectively. Separate storage and test facilities handle LPG meters. There are also two underground storage tanks piped to test dispensing pump meters.

test station

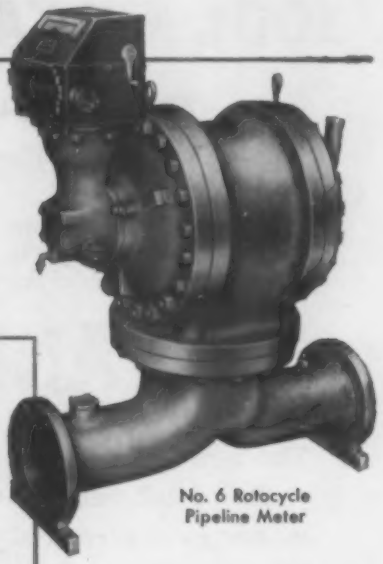
measurement for you

Rockwell *ROTOCYCLE* Meters

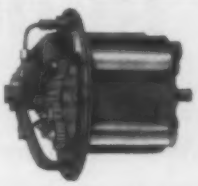
YOU CAN REALLY ROCKWELL RELY ON ROCKWELL



No. 4 Rotocycle Meter for loading racks



No. 6 Rotocycle Pipeline Meter



The "heart" of every Rockwell Rotocycle meter is this ball bearing mounted, all-revolving rotor.

Big or Little—Insist on Rockwell *Job-Tested* Meters the Next Time You Buy

The accuracy and durability of the Rotocycle measuring principle has been proved by time—its free running, low pressure absorbing characteristics are a matter of record. Now, thanks to Rockwell's progressive action in establishing testing facilities unequalled in industry, you can be sure the Rotocycle meters you buy have been custom proved to meet any service requirement. There's a size and type for every need. Write for catalog.

ROCKWELL MANUFACTURING COMPANY PITTSBURGH 8, PA.

Atlanta Boston Chicago Dallas Houston N. Kansas City, Mo. Los Angeles New York Philadelphia Pittsburgh San Francisco Seattle Tulsa

Canadian Gas & Oil Products Sales: Peacock Brothers, Limited

Gilbarco

West Springfield, Mass.
Toronto, Canada

Gilbert & Barker Mfg. Co.
West Springfield, Mass.

Gentlemen:

Please send me brochure on the Gilbarco Electronic Tank Gauge.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

NOW YOU CAN MAINTAIN 100% GREATER ACCURACY

This coupon will bring you full information on a revolutionary

NEW ELECTRONIC TANK GAUGE

The new Gilbarco Electronic Tank Gauge, the result of years of laboratory research and field testing, actually *measures electronically*. No adjustments needed for varying specific gravities or viscosities. Can be installed *without* taking tank out of service. Liquid is measured with a degree of accuracy never before approached by any other method of gauging. And equally accurate readings can be made at remote points. Get full information on this revolutionary new gauge *today*.

2 Headline Attractions in PIPELINE CONSTRUCTION

The new Type 49 WALWORTH Gate Valve

★ Through-port design; body and disc ports accurately indexed and the body ports bored to match the pipe.

★ No recesses, no obstructions.

★ Stellite-faced seat rings.

★ Walworth boltless design body-to-bonnet joint.

★ May be installed without regard to flow direction.

★ No internal lubrication needed.

★ Incorporates 111 years of Walworth experience in the manufacture of bronze, iron, and steel valves.

Sizes 2" to 30"

MIDWEST Welding Fittings

Many welding fittings were first offered by Midwest, and highly desirable exclusive features have been developed over a period of more than 22 years. The Midwest line of welding elbows is the most varied on the market. Midwest is an honored name with pipeline companies, engineers, and contractors.

J&L STEEL

Jones & Laughlin STEEL CORPORATION

SUPPLY DIVISION — TULSA, OKLAHOMA

Serving The United States and Canada

P·E·S·A

PARTNERS IN PETROLEUM PROGRESS

Fight Corrosion

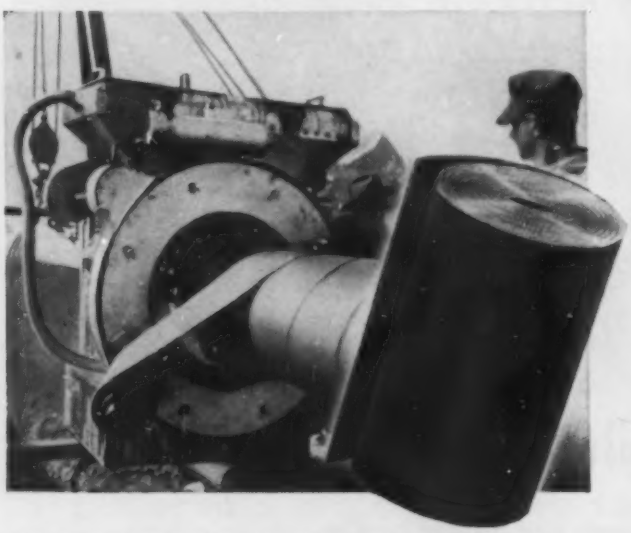
with these

Johns-Manville Pipe Protection Materials

...cut maintenance expense
increase pipe life

TRANSHIELD Asbestos Felt—

This newly developed low cost pipe line protecting wrapper is designed for average soil conditions. It is reinforced with continuous glass yarns, parallel spaced on ¼" centers to give tear-free application strength. Made of coal-tar saturated asbestos, it acts as a continuous barrier to shield pipe line enamels from earth loads and soil stresses.



15-LB. ASBESTOS Pipe Line Felt—

A heavy-duty material particularly suitable for severe soil conditions or where a heavier material than J-M Transhield is desired. Provides long life, toughness, flexibility, resistance to rot, decay, cracking, and impact. J-M 15-lb. Asbestos Felt now protects more than 100,000 miles of oil and gas pipe lines. Widths 2" to 36". Rolls any length desired.

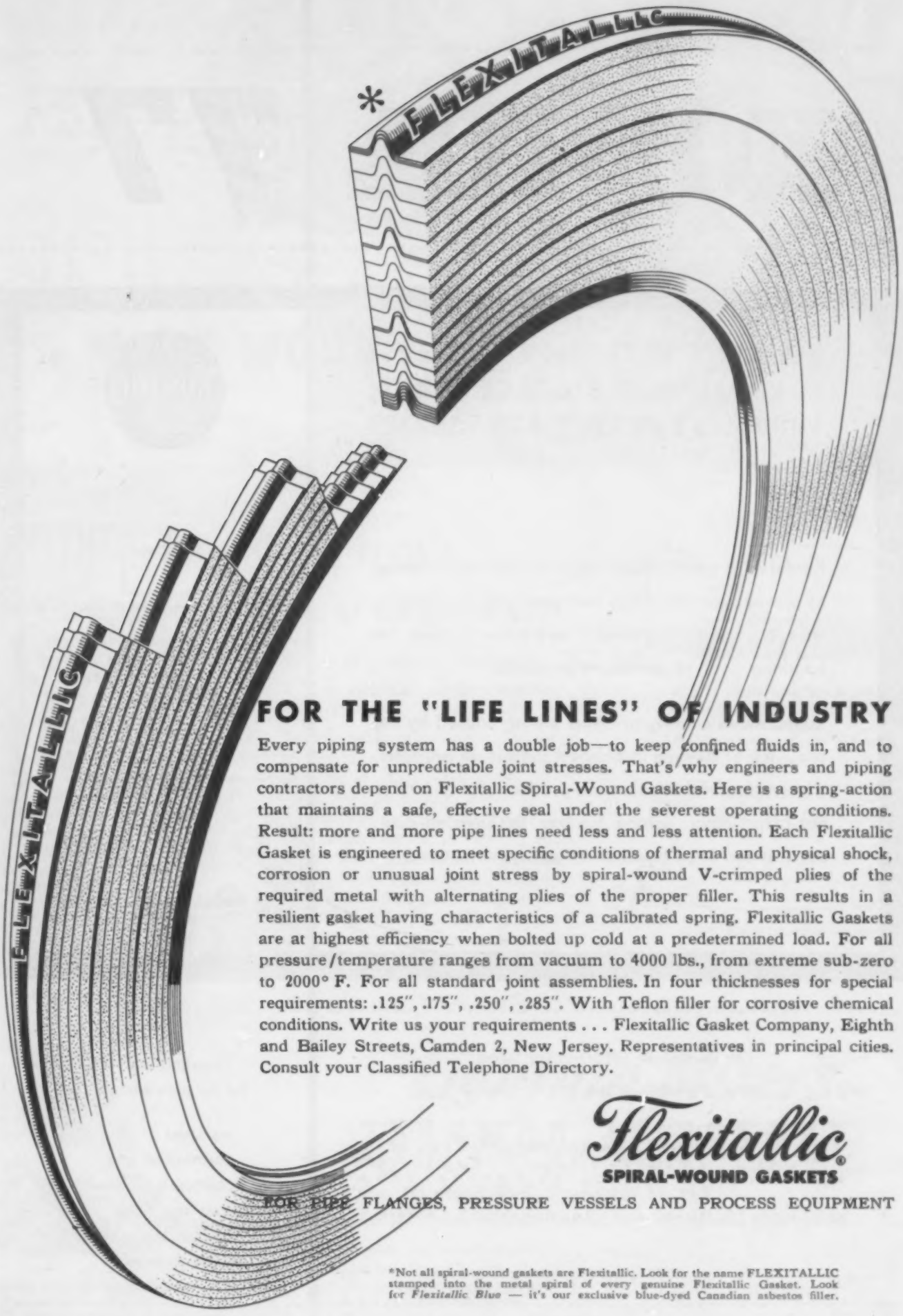
TRANTEX® Polyvinyl Tape—

A widely used coating where ease of application is important . . . over field welded joints of mill-wrapped pipe . . . for rush coating needs. Pressure-sensitive . . . sticks to pipe on contact, forming a firm stable bond. Can be cold-applied by hand or with simple wrapping machines. In rocky soils, an outer wrap of J-M Transhield or J-M 15-lb. Asbestos Pipe Line Felt is recommended.

For further information about Johns-Manville Products for Pipe Line Protection, write to Johns-Manville, Box 60, New York 16, N. Y.; in Canada, 199 Bay St., Toronto I, Ont.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville PRODUCTS FOR PIPELINE PROTECTION



FOR THE "LIFE LINES" OF INDUSTRY

Every piping system has a double job—to keep confined fluids in, and to compensate for unpredictable joint stresses. That's why engineers and piping contractors depend on Flexitallic Spiral-Wound Gaskets. Here is a spring-action that maintains a safe, effective seal under the severest operating conditions. Result: more and more pipe lines need less and less attention. Each Flexitallic Gasket is engineered to meet specific conditions of thermal and physical shock, corrosion or unusual joint stress by spiral-wound V-crimped plies of the required metal with alternating plies of the proper filler. This results in a resilient gasket having characteristics of a calibrated spring. Flexitallic Gaskets are at highest efficiency when bolted up cold at a predetermined load. For all pressure/temperature ranges from vacuum to 4000 lbs., from extreme sub-zero to 2000° F. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285". With Teflon filler for corrosive chemical conditions. Write us your requirements . . . Flexitallic Gasket Company, Eighth and Bailey Streets, Camden 2, New Jersey. Representatives in principal cities. Consult your Classified Telephone Directory.

Flexitallic®
SPIRAL-WOUND GASKETS
FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Not all spiral-wound gaskets are Flexitallic. Look for the name FLEXITALLIC stamped into the metal spiral of every genuine Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

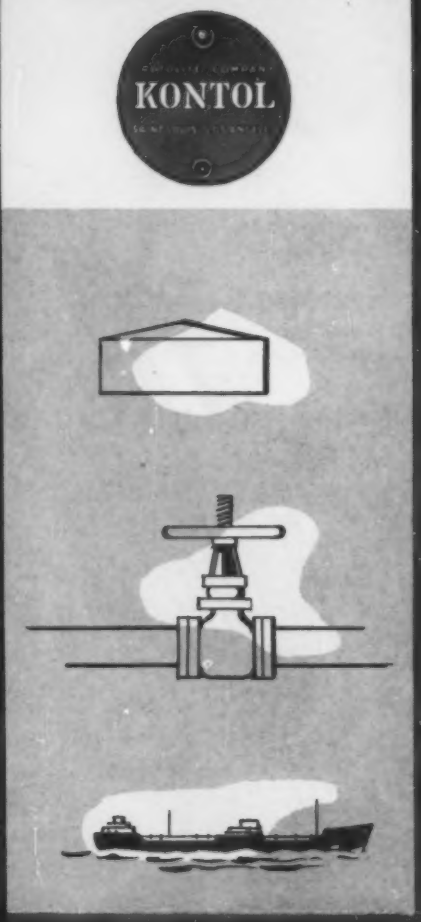
For more data on advertised products, use Readers' Service Cards, last page.

KONTOL® 77

PREVENTS CORROSION AND RUST FORMATION IN STORAGE TANKS, PRODUCTS PIPE LINES AND TANKERS

Kontol 77 is an oil-soluble organic inhibitor designed to prevent corrosion and rust formation in products lines, storage tanks, tankers, and other facilities for handling finished petroleum products.

Kontol 77 effectively prevents rusting caused by the presence of oxygen in finished petroleum products. It has no harmful effect on the product quality. It does not affect color, octane number, accelerated gum, precipitated lead or other av-gas specifications.



For complete information, call your Tretolite man or write to:

TRETOLITE COMPANY

A DIVISION OF PETROLITE CORPORATION

Saint Louis 19, Missouri • Los Angeles 22, California

KPL 54-17

Chemicals and services for the petroleum industry

- DESALTING
- DEHYDRATING
- CORROSION INHIBITING
- SCALE PREVENTING
- PARAFFIN REMOVING
- WATER DE-OILING

LIGHTNIN MIXERS in service at this pipe line tank farm keep B. S. & W. in uniform suspension in the crude. They eliminate the need for periodic tank cleanout.

Make your tanks do 12% MORE WORK

CONTROL B. S. & W. to get

extra storage capacity . . . *at no extra cost*

If yours is like many tank farms, bottom sludge may be stealing 12% of your tank storage capacity.

You can say good-bye to this costly nuisance—for good—by installing LIGHTNIN Mixers to control B. S. & W. in your tanks.

You can save money four ways by using LIGHTNIN Mixers:

1. You increase tank capacity, because LIGHTNINS prevent bottom sludge buildup.

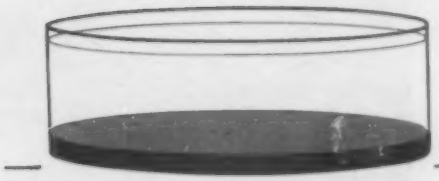
2. You save petroleum values often lost in the sludge (a 2-foot level of sludge in a 120-foot diameter tank may contain 4,000 barrels of merchantable material).

3. You save tank cleanout costs.

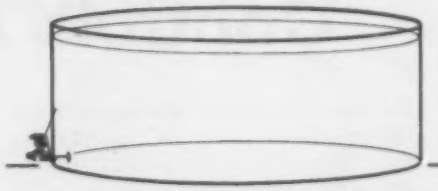
4. You eliminate tank downtime for cleaning.

Because of these savings, LIGHTNIN Mixers have paid for themselves in as little as three weeks! We can show you figures to prove this.

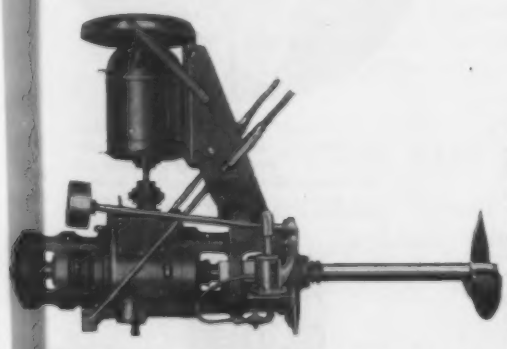
Be sure to get LIGHTNIN Mixers—they're *guaranteed* to do the job right. Full satisfaction—or your money back. This unique guarantee is backed by thousands of successful installations in pipe line company and refinery tank farms. Sold by factory-trained engineers, experienced in serving the oil industry. Specify LIGHTNIN—and be sure.



BEFORE USING LIGHTNIN MIXERS
Diameter—120 ft.
B. S. & W. level—2 ft.
Storage capacity lost—4,000 bbls.



AFTER USING LIGHTNIN MIXERS
Diameter—120 ft.
B. S. & W. level—None
NO storage capacity loss



LIGHTNIN SIDE ENTERING MIXERS For tanks up to 6 million gallons capacity. Full range of sizes—1 to 25 HP. Gear drive (shown) or V-belt drive.

MIXCO fluid mixing specialists

Lightnin® Mixers

MIXING EQUIPMENT Co., Inc.

196-a Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.

Please send me, without obligation:

☐ B-503—New 4-page illustrated bulletin giving complete information on B. S. & W. control and savings.

☐ B-104—New 20-page illustrated catalog containing full description, specifications and dimensions of LIGHTNIN Side Entering Mixers.

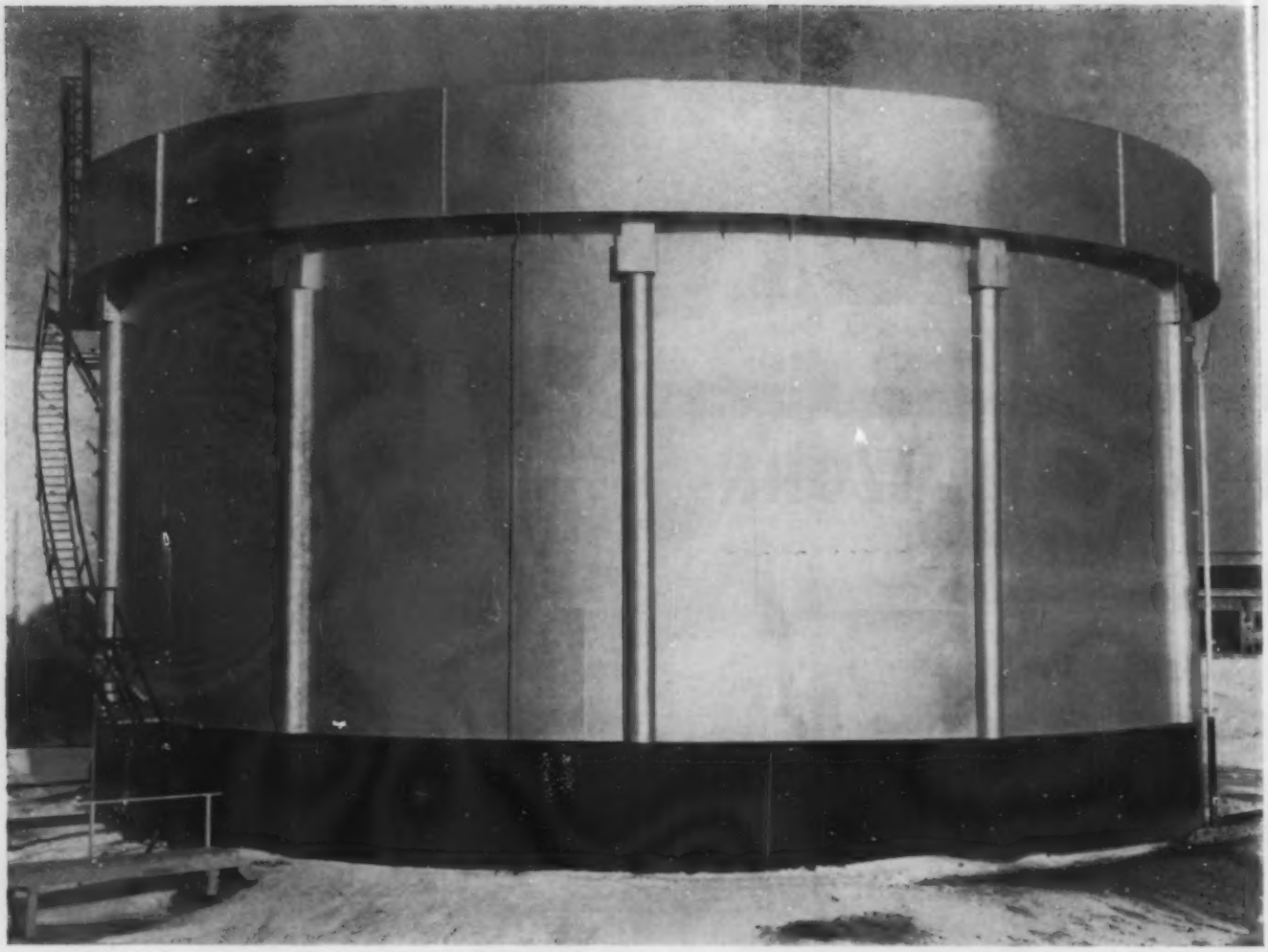
Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____



Bethlehem Lifter Roof Tank Controls Air Vapor...Cuts Losses

For the "standing" storage of volatile products—that is, where you have infrequent fillings and continual withdrawals—there is no more reliable and, in the long run, no more *economical* storage than the Bethlehem Lifter Roof Tank.

It is soundly constructed; simple yet ingenious in design. The roof is actually a single-lift, roller-guided, liquid-seal gas holder. During the heat of day, as the air-vapor volume increases within the tank (or within several tanks hooked up with a single lifter roof tank to form a closed system), the roof rises smoothly, providing the extra storage space needed. At night, when the air-vapor contracts, the roof returns to the low position. Breathing losses are held to an almost negligible minimum!

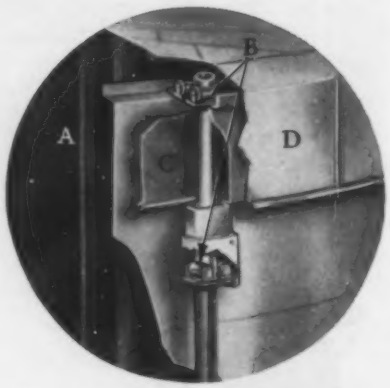
In addition, the Bethlehem Lifter Roof Tank provides *all-weather* storage. The sloping cone roof, the nonfreezing sealing liquid, the weather hood and the protected roller guides all assure dependable performance despite extreme cold, heavy snowfall and severe icing conditions.

There are many more features of design and construction that will surely interest you. They are fully described in our Booklet 584. We suggest you obtain a copy, by writing Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

Bethlehem Designs and Builds cone-roof tanks—dome-roof tanks—umbrella-roof tanks—lifter-roof tanks—floating-roof tanks—vapor compartment tanks—pressure vessels—gas holders—propane tanks.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



When down, roof rests on fixed supports (A). Rollers (B) guide roof as it rises. Seal is provided by dip ring (C) extending into trough filled with sealing liquid, which is shielded by weather hood (D).

BETHLEHEM STEEL

THE answer may be "Yes" if you coat with an "economy" enamel. For your first cost may be only a down payment on a lifetime installment plan for expensive maintenance. When you specify time-tested *coal tar* enamel, your upkeep and maintenance costs are usually almost negligible, thanks to its unique ability to resist soil stress and water absorption, year after year.

Don't gamble on a major long-term investment to "save" a few first-cost dollars. Play it safe, as scores of leading pipeline companies do each year. Specify *Pitt Chem* Tar Base Enamels and be *sure* of low-cost, long-lasting protection. *Pitt Chem* Tar Base Enamels are manufactured to rigid specifications by a basic producer—your *best* assurance of uniform quality and peak protection with every drum you buy. ● Write today for further details or technical assistance.

PITT CHEM® TAR BASE ENAMELS

- Standard Grade
- Modified Grade
- Plasticized Grade
- Hotline
- Cold Applied Tar Base Coatings

W&D 5457

PROTECTIVE COATINGS DIVISION
PITTSBURGH COKE & CHEMICAL CO.
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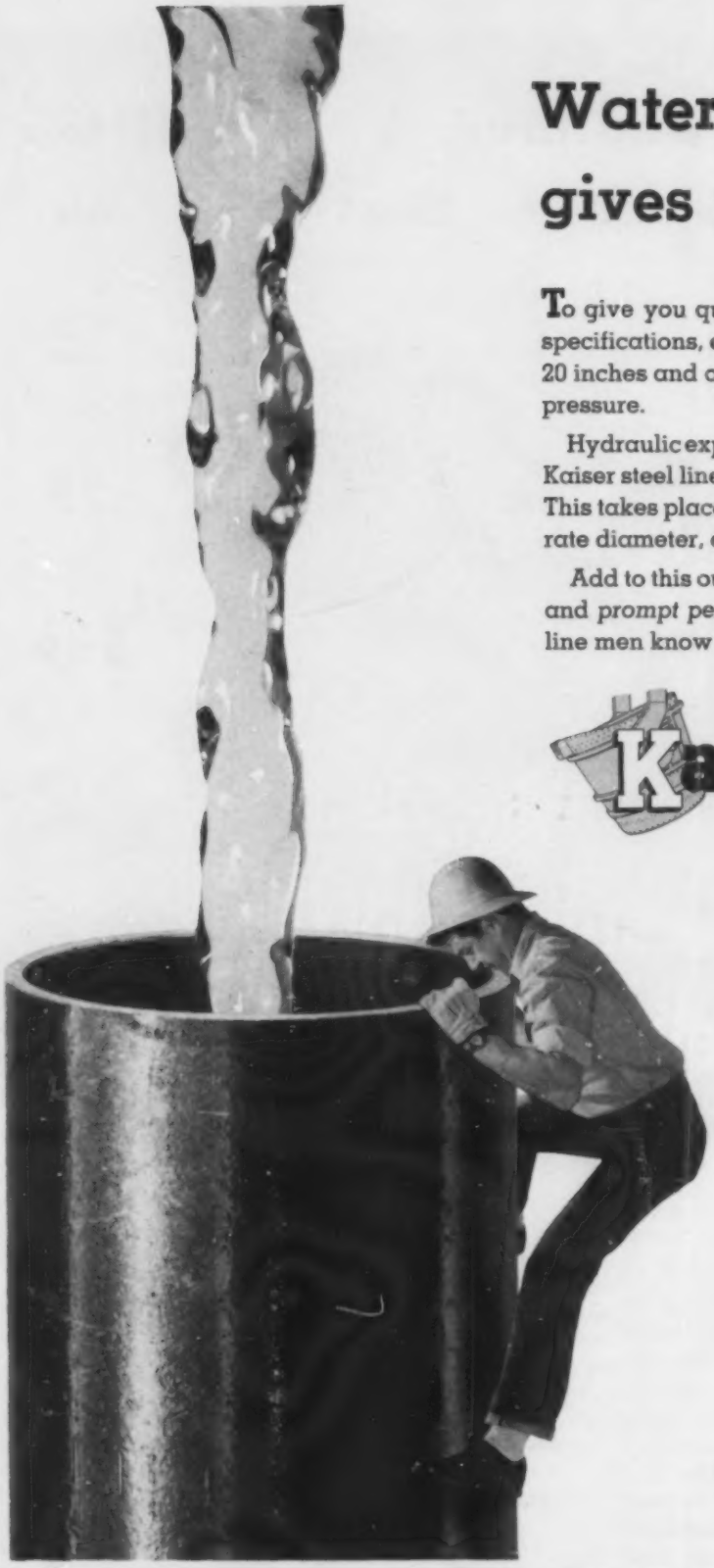


Water treatment gives you better pipe!

To give you quality line pipe that meets your exact specifications, every length of Basalt-Kaiser steel pipe 20 inches and over is expanded by water under great pressure.

Hydraulic expansion increases the strength of Basalt-Kaiser steel line pipe through additional cold working. This takes place within restraining dies assuring accurate diameter, concentricity, and straightness.

Add to this our *on-time delivery, wide range of sizes* and *prompt personal service* and it's clear why pipeline men know they can rely on Kaiser Steel.

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

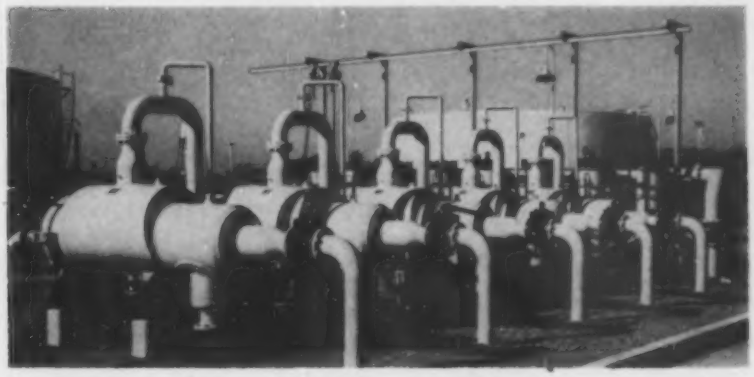
Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York

For Pipeliners

who are tired of doing it the hard way

For years, pipeliners have been plagued with the task of removing dirt from pipeline products in order to protect the meters, to assure correct measurement, and to deliver a clean product to the consumer.

Heretofore, it has been no problem to trap the dirt. But what to do with the dirt after it was trapped: That was the sixty-four dollar question! For just when the strainers were needed most . . . immediately prior to the arrival of a pig . . . the strainer elements couldn't be cleaned fast enough to keep the strainers in operation. For that reason it was cus-



An installation of five, 30,000 bbl. capacity, Jet Type Self-Cleaning Fluid Strainers on one of the largest U. S. products pipe lines.

tomary to bypass the stream . . . or just let the strainer elements blind and burst . . . and the meters took the rap.

The obvious challenge was to design a strainer that could be cleaned quickly and returned to service so that no matter how dirty the stream became it could be sent through the strainers and cleaned up.

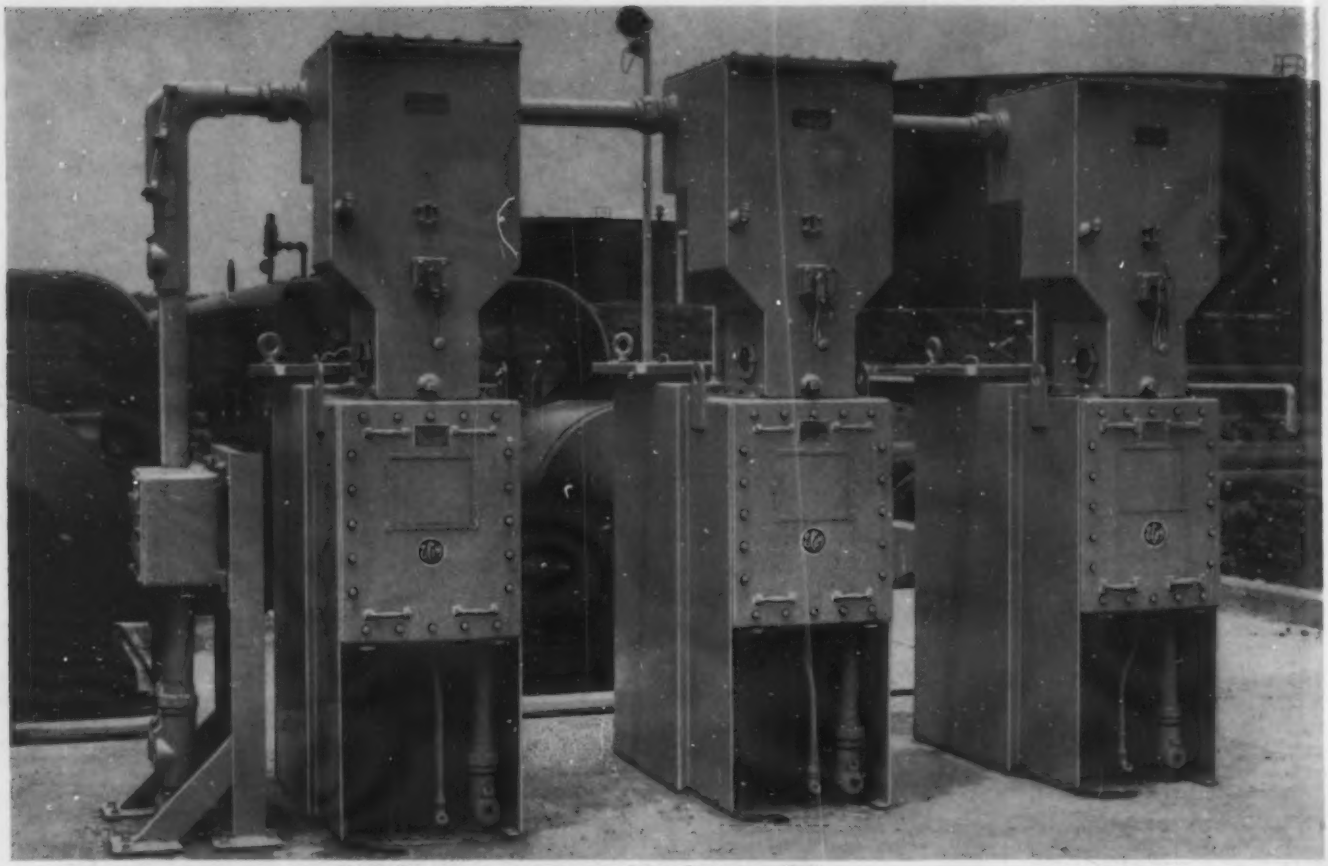
That, in a nut shell, is what has been accomplished with the Jet Type Self-Cleaning Fluid Strainer. Utilizing hydraulic impact through built-in rotating jets, the stainless screen basket of this remarkable strainer can be cleaned in one minute. Only five minutes, or less, is required to take the strainer off stream, clean it, and return it to service.

Installations of Jet Type Self-Cleaning Fluid Strainers have proved beyond doubt their sound design and entirely satisfactory performance.

Interested pipe line operators are invited to write for complete details.

THORNHILL UNIBOLT **CRAVER CO.**

P. O. BOX 1184 **HOUSTON, TEXAS**

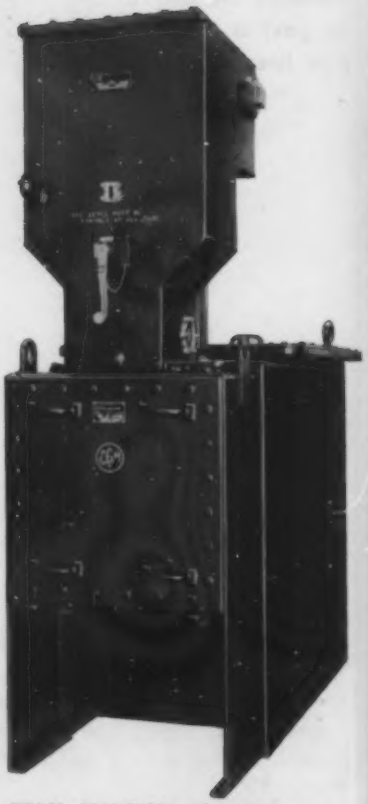


EC&M Starters in operation at large Louisiana Refinery.

FULL PROTECTION FOR VITAL DRIVES with EC&M 2200 - 5000 VOLT Motor Starters

- **SAFE OPERATION** — Starters are designed for requirements of Class I, Group D hazardous locations, with main motor circuits made and broken under oil.
- **HIGH INTERRUPTING CAPACITY** — EC&M Starters are rated at 50,000 KVA interrupting capacity based on *certified tests.* For higher ratings, these starters are built in the VALIMITOR style (oil-immersed reactors limit infinite KVA to a finite value easily cleared by the starter).
- **PERSONNEL PROTECTION** — Combination type with Oil Disconnect Switch has view window on each side to show position of disconnect contacts.
- **MOTOR PROTECTION** — Thermal-Magnetic Overload Relays guard motors by inverse time on overloads . . . trip instantly on fault currents.
- **LUBRICATED AND PROTECTED** — EC&M Starters require infrequent inspection and minimum maintenance because oil immersion protects the starter mechanisms from corrosive atmospheres.
- **COMPACT NEAT INSTALLATION** —Starters require little mounting space, allowing ample room around each unit for inspection and maintenance.

Write for booklet 1062
Describing and illustrating EC&M Motor Starters for petroleum applications.



EC&M 2200-5000 volt starter with self-contained oil disconnect switch.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 East 79th Street ★ Cleveland 4, Ohio

6025

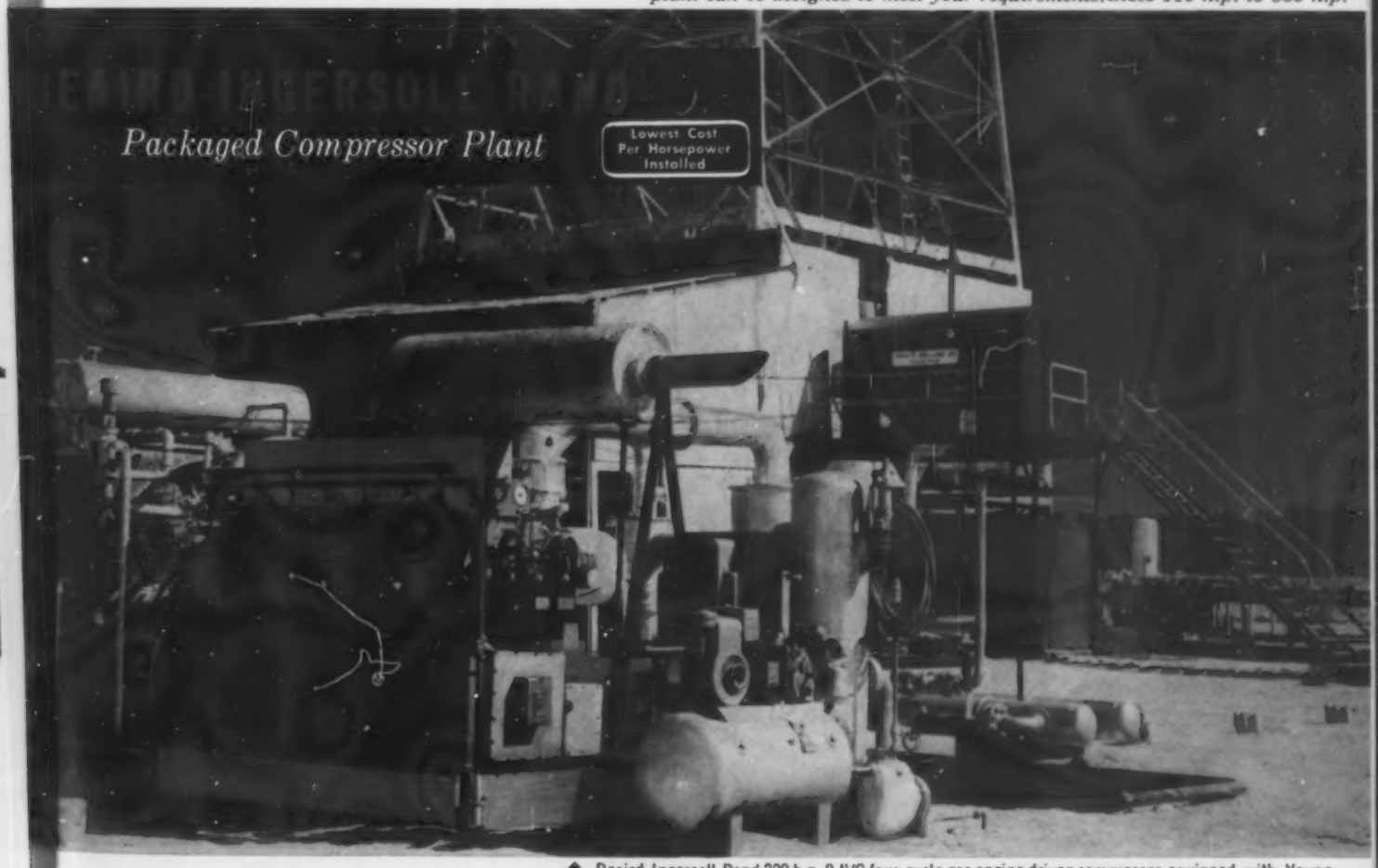
PACKAGED COMPRESSOR *SPEEDS* PENETRATION RATES ON TEST WELLS

OIL INDUSTRY TECHNOLOGISTS, investigating methods of reducing present-day drilling costs, recently started a series of tests using aerated mud. Of major importance to this program was the selection of a compressor. The unit had to deliver, automatically, full rated capacity over a wide range of pressures — to operate virtually unattended, leaving the crew free for regular duties. When moving it was essential that only oil field equipment be used and no special foundation required at the drilling site.

A Beaird-Ingersoll-Rand 4-Cycle Packaged Compressor Plant, 220 horsepower 8 JVG, was purchased by Phillips Petroleum Company for this task. Beaird engineers installed automatic controls that permit it to slow down or pick up speed over a range of 50% to 100% according to discharge conditions. A stop valve on the rig floor is all that is required to shut off air instantly for a connection or a trip. Other automatic controls safely handle this sudden change in operation — slowing the engine and unloading the compressor cylinders.

Mounted on its own heavy steel skid base, the compressor is set in a shallow pit near the rig and ballasted with sand or caliche. It moves as a single over-the-road package between drilling sites. On the new location only connections to fuel and mud lines are required to place it into operation.

Let us show you how a Beaird-Ingersoll-Rand packaged compressor plant can be designed to meet your requirements. Sizes 110 h.p. to 660 h.p.



▲ Beaird-Ingersoll-Rand 220 h.p. 8 JVG four-cycle gas engine driven compressor equipped with Young radiator and all necessary equipment and controls on Phillips Petroleum Company's drilling rig.

THE J. B. BEAIRD COMPANY, INC.
Shreveport, Louisiana

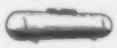
BEAIRD

CHINING • MANUFACTURING • STEEL WAREHOUSE

PACKAGED COMPRESSOR PLANTS

CAST STEEL FITTINGS

PRESSURE BULK STORAGE


ANHYDROUS AMMONIA EQUIPMENT

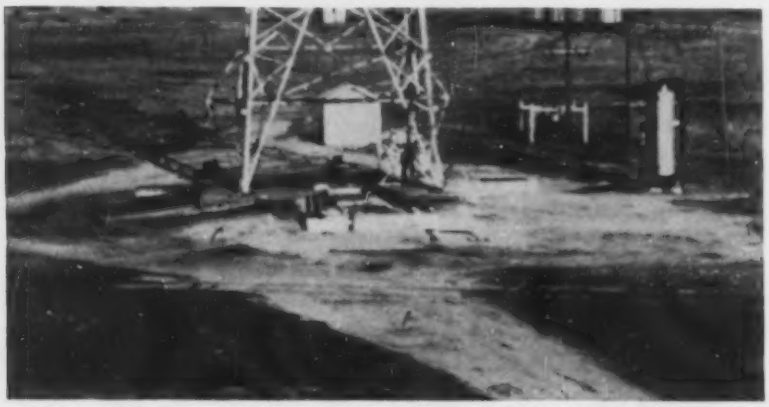
LP-GAS SYSTEMS

Weed and Brush Control lasts longer with Du Pont TELVAR® and AMMATE®

Weed Killers *Weed and Brush Killer*

Fire hazards are reduced around oil storages from thorough, long-term weed control with Du Pont "Telvar." "Telvar" is non-corrosive, won't harm application equipment.

Heavy weed growth was controlled with one application of "Telvar." "Telvar" keeps pipelines and key areas accessible, efficient to work around.



"Telvar" is ideal for weed control around derricks, pumps, storages. "Telvar" is easy to apply; extremely low in toxicity to humans and animals; non-flammable; and non-volatile.

One application of "Telvar" solves weed problems for a season or longer!

"Telvar" kills through the roots . . . prevents regrowth. Low dosages (20 to 80 lbs. per acre) make it cost little for the results you obtain. Low rates also mean less handling, less storage facilities. If you're looking for a way to cut maintenance costs to new low levels, include "Telvar" in your weed-control program. Available in two formulations: "Telvar" W; and "Telvar" DW, which is especially suited for light, sandy soils and in areas where annual rainfall is higher than 20 inches.

"Ammate" kills more kinds of brush and keeps it down longer than most weed and brush killers!

When the original spray job is well done, brush is kept under control with nothing more than an occasional spot spray later. You can rely on "Ammate" to do the job safely, even where your rights-of-way adjoin crop land, because "Ammate" is not volatile. There are no vapors to drift onto sensitive crops.

FREE ILLUSTRATED BOOKLETS describe how to control weeds and brush with Du Pont chemicals. For your copies, write to Du Pont, Grasselli Chemicals Dept., Rm. D 4032, Wilmington, Del. In Canada—Du Pont Company of Canada Limited, Box 660, Montreal.

TELVAR® AMMATE®

Weed Killers *Weed and Brush Killer*

On all chemicals always follow directions for application. Where warning or caution statements on use of product are given, read them carefully.

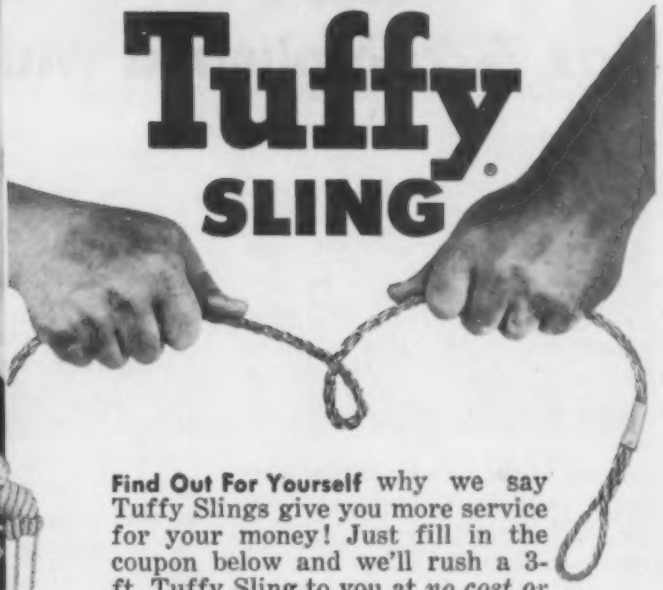
DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

TEST IT TO DESTRUCTION IF YOU CAN!

FREE Tuffy® SLING



Find Out For Yourself why we say Tuffy Slings give you more service for your money! Just fill in the coupon below and we'll rush a 3-ft. Tuffy Sling to you at *no cost or obligation.*

Then Prove Tuffy's Toughness with any test you want to make! Loop it, knot it, kink it, jerk it—we won't be worried, even if you test your free Tuffy Sling on weights up to *twice* the rated working load!

You'll Find The Exclusive, patented braided-wire fabric construction takes strains and jolts that soon snap ordinary rope slings! It's the unique machine braided, 9-part construction that helps your Tuffy Sling resist kinking—and if you *can* kink it, you straighten it out in minutes *without material damage!*

Get Your Free Tuffy Sling and discover why more and more people are switching to Tuffy every year!

Tuffy® HOIST LINE

The Hoist Line That Matches Tuffy Slings in strength and wearability—that's *Tuffy* Hoist Line! Absorbs load shocks smoothly, because it's designed *only* for hoisting... passes safety checks weeks after ordinary ropes would have been thrown away!

Ordering Is Easy! No complicated specifications—just state length, diameter and the name, "Tuffy Hoist Line." Reeve your crane with Tuffy and see the difference!

Your Tuffy® Distributor Will Help You Keep Your Inventory Down!

He's Happy To Stock Ahead of your needs... wants to work closely with you to assure the best possible service. Just give him a rough idea of your future requirements and backed up by his nearby Union Wire Mill depot, he will keep a full stock to draw on against your needs. Get together with him—*soon.*

union Wire Rope corp.

Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

TEAR OFF AND MAIL COUPON *NOW!*

Union Wire Rope Corporation
2278 Manchester Ave., Kansas City 26, Mo.

At no cost or obligation to me, please rush the material I have checked:

- ☐ FREE 3-Ft. Tuffy Sling!
- ☐ FREE Sling Handbook and Rigger's Manual, Featuring 12 Tuffy Factory-Fitted Types!
- ☐ Name and Address of Tuffy Distributor Nearest Me!

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A message from the president . . .

Contractors Association Has Accomplished Much

By G. AUSTIN MANUEL, President Pipe Line Contractors Association

DURING THE SHORT seven-year span since its organization, the Pipe Line Contractors Association has made much progress. It has contributed much to the pipe line construction business and also to the oil and gas industry.

Ahead of the association lies even greater possibilities. The association now has passed through the difficult organization period. Therefore, it is in a much better position to devote more time and effort to the problems which confront the pipe line contract construction business.

Formation of the Pipe Line Contractors Association was the outgrowth of a realization that many problems could be solved more successfully by an organized group working in concert than by unrelated individual action. Since membership in the Association is by firms rather than by individuals, the benefits that come from affiliation are available to each member of such firms, thus spreading widely the influence of the Association.

The 47 regular and special member firms build an estimated 90 percent of all the cross country oil, gas and products pipe lines in the country. The 70 associate member firms of the association are the suppliers, equipment dealers and manufacturers all over the country.

The general purposes of the association are:

- To make membership in the association a reasonable assurance to the public of the skill, integrity and responsibility of its members.
- To maintain the standards of the pipe line contracting business at the level necessitated by its quasi-professional character and to establish members of the association in the public mind as contractors who fulfill obligations in good faith.
- To promote more cordial and cooperative relations among pipe line contractors and between pipe line contractors and those with whom they deal or have contact.
- To encourage efficiency among pipe line contractors and their employes.
- To seek correction of injurious, discriminatory or unfair business methods practiced by or against pipe line contractors.
- To eliminate as far as possible the occurrence of injury and death to pipe line contracting employes.

In carrying out these aims and purposes the association can point to the numerous activities as concrete evidence of some of its accomplishments. National labor agreements have been negotiated prescribing uniform working conditions and wages not only for members of the association but for many other pipe line contractors as well. These agreements minimize the danger of work stoppages and assure timely completion of work under contract.

Representatives of the association assisted in the preparation of a standard for field welding of pipe lines, and are now cooperating with other industry representatives in preparing similar codes or standards for pipe coating and high pressure gas piping. For several years representatives of the association have assisted an API committee in preparing a bulletin of recommended pipe line procedures to be used in constructing crude oil and product pipe lines. Several years ago an illustrated booklet on pipe line construction was published and over 5000 copies have been distributed throughout the entire world.

A Safety Manual for Pipe Line Construction was published and offered to the industry and has received a very gratifying response. Carrying further its efforts to encourage safe working practices to safeguard life and limb, the association last year began monthly publication of a safety bulletin for pipeliners —2000 copies of which are mailed each month.

These are but a few instances in which the Pipe Line Contractors Association is working in the interest of its members and the pipe line industry as a whole. During the forthcoming seventh Annual Convention in Los Angeles, prominent industry leaders will appear as speakers, and members of the association will continue their efforts to carry out the purposes which bound them together originally.

About the President

G. AUSTIN MANUEL, president of the Pipe Line Contractors Association, started in the pipe line contracting business as a timekeeper and served as field office manager, spread superintendent and division superintendent before organizing the Williams-Austin Company. He was with Booth & Flynn in 1927-1929 and with Williams Brothers Corporation from 1929 until 1949. The Williams-Austin Company was organized in 1949. He became a member of the Pipe Line Contractors Association in 1950; served as member of the Labor Committee in 1952, 1953 and 1954. He also served as a director of the association in 1953 and 1954.

NEILL BLEDSOE THOMAS GUMP SMITH McFARLAND

BURDEN WILLIAMS OWEN ALLEN GREGORY HESTER

OFFICERS OF PIPE LINE CONTRACTORS ASSOCIATION besides President-Director G. A. Manuel are James P. Neill, Western Pipe Line Constructors, first vice president and director; C. C. Bledsoe, Midwestern Constructors, second vice president and director; John M. Thomas, H. C. Price Company, treasurer and director, and Richard A. Gump, executive secretary. Other directors are Ray Leigh Smith, Ray L. Smith & Son, Inc.; N. K. McFarland, Lone Star Constructors; O. R. Burden, O. R. Burden Construction Corporation; John H. Williams, Williams Brothers Company; Kenneth A. Owen, Parkill Truck Company; Earl Allen, Associated Pipe Line Contractors; R. P. Gregory, Houston Contracting Company, and T. A. Hester, Oklahoma Pipe Line Constructors.

Contractors to Meet in Los Angeles

Association convention moves out of Southwest for first time.

THE FIRST Pipe Line Contractors Association convention to be held outside the Southwest will be in session in Los Angeles, January 16-19. The move to the West Coast for the seventh annual meeting reflects the expanding nationwide interest in the convention and the increased importance of Canadian pipe line construction. More than 500 registrants are expected. G. A. Manuel, president of Williams-Austin Company of Pittsburgh, is Association president.

Organized in 1947 by 17 contractors meeting in Dallas, the group affiliated with the Associated General Contractors of America, nationwide trade association, and was granted a charter under the name "Mid-Continent Pipe Line Chapter." Name of the group was changed to "Pipe Line Contractors Association" in 1949, and membership expanded to include subcontracting and specialty contracting

- To maintain the standards of the firms and pipe line equipment manufacturers and suppliers.

Association membership now totals 47 regular and special member firms, who build an estimated 90 percent of all cross country oil, gas and products lines in the country, and 70 associated member firms from suppliers, dealers and manufacturers across the nation.

By serving on joint committees with representatives of various groups in the oil and gas industry, members have contributed much toward achieving the purposes for which the association was formed:

- To make membership in the association a reasonable assurance to the public of the skill, integrity and responsibility of its members.

For a complete calendar of events, see Pages 20-21.

pipe line construction business at the level necessitated by its quasi-professional character and to establish members of the Association in the public mind as contractors who fulfill obligations in good faith.

- To promote more cordial and cooperative relations among pipe line contractors and between Association members and those with whom they deal.
- To encourage efficiency among pipe line contractors and their employes.
- To seek correction of injurious, discriminatory or unfair business methods practiced by or against pipe line contractors.
- To eliminate as far as possible the occurrence of injury and death to pipe line contracting employes.

First convention was held in Tulsa in November, 1948. The last five were held in Houston.

What you'll be reading about in '55 . . .

THERE'S A NEW ERA ahead in pipelining and it's full of technical advancements. Here are a few of them, that you'll be reading about in the next few months.

New Piping Code for Gas Industry

Scheduled to be published by the American Society of Mechanical Engineers early this month is the new Section 8, ASA B-31 piping code. This code has the approval of the American Gas Association as well as the American Standards Association. It will simplify and standardize design, construction and testing of all gas lines, whether distribution, gathering or transmission.

•

Acrosonics for Underwater Subsurface Surveys

A modified fathometer has been used to pick up sub-surface information 20 feet or so beneath a 70-foot-deep lake. The new device shows the mud-water contact; the mud-dehydrated soil contact, and the dehydrated-soil/solid-strata contact.

Used in South America not long ago, it enabled designers of a submarine pipe line to skirt the rims of two extinct volcanoes.

•

Multi-Stage Centrifugal Compressors

Trouble with centrifugal compressors now in use is that they must be specially designed for a specific service, and their operating efficiency encompasses a narrow range.

But a new multi-stage centrifugal compressor that may alter the gas compressing picture will be field tested soon. Developers believe that its range of efficiency will extend to almost any useful compression ratio.

•

New Steel for Pipe Lines

A new steel that's easily welded and behaves itself at fairly low temperatures has a minimum yield of about 100,000 pounds per square inch. Its ultimate is said to be more than 120,000 psi.

Developers of the new alloy are now making experimental pipe from it. If the steel can be produced cheap enough, it will be used widely for manufacture of big-inch pipe. Its first uses will be limited to specialty piping and vessels.

•

Deep Water Submarine Hot-Tap

A hot tap in 35 feet of ocean water will be made before long on a high-pressure natural gas and condensate pipe line. The job is out for bid.

SURVEY FOR '55 SHOWS

U. S. Pipe Line C
Due to Increase b

Confidential reports from 197 c mpa of new lines will be built inside the conti enta projects go through, this could be the co trac

By **DONALD M. TAYLOR,** Editor, PIPE LINE INDUSTR

ACCORDING TO A CONFIDENTIAL SURVEY circulated among all pipe line companies in the United States, construction of new lines will take an upswing in 1955, reversing last year's decline.

All told, 197 companies disclosed 1955 plans to PIPE LINE INDUSTRY. And with this as the basis, the editors are predicting that **19,900 miles** of new pipe lines, four inches and larger, will be constructed inside the continental limits of the U. S. in the coming year.

This is an increase of 12 percent over last year's total which tallied up to 17,745 miles.

These figures do not include lines smaller than four-inch, lines inside corporate city limits and lines constructed in Canada, Alaska, etc.

In all probability, the estimate of this year's construction is on the conservative side. None of the lines proposed by non-operating companies was added to the totals—even though chances are that several of these projects will be approved and partially constructed in the next 12 months.

Exceptions were Pacific Northwest Gas Company and American-Louisiana Gas Company. Both of these projects have been approved by the Federal Power Commission and both of them have sound backing. Both likely will be laid. For these reasons, they were entered in the 1955 estimate at half their length. In other words, the 1466-mile-long Pacific Northwest line was entered at 733 miles, even though its backers are predicting completion in 1955.

NATURAL GAS LINES

A total of 6992 miles of gas transmission lines four inches and larger was constructed in the U. S. in 1954. In 1955 this figure will be upped to an estimated 8900 miles. This increase amounts to 27 percent.

One of the unusual things about the estimated 1955 total is that it will represent expansion in depth rather

Construction by 12-15 Percent

mpanies indicate that almost 20,000 miles
ntal U. S. this year. If certain Canadian
tractor's best year.

FORECAST FOR '55

	1954	1955
GAS LINES		
Gathering	1968	2500
Transmission	6992	8900
CRUDE LINES		
Gathering	2201	2300
Transmission	2624	2200
PRODUCTS LINES		
Gathering	346*	——
Transmission	3614	4000
TOTALS	17,745	19,900

* Butane and propane lines

than expansion into new market areas (Pacific Northwest, of course, is an exception). Numerous companies will be laying 100 miles or so of loop to increase capacity and perhaps eliminate bottlenecks in their systems.

In addition to the transmission lines, gas companies, oil companies and even crude and products pipe line companies laid gas gathering lines last year. The total came to 1968 miles.

But in the year ahead, these various companies will lay an estimated 2500 miles of gas gathering systems.

This brings the total miles of gas lines to:

Total U. S. gas lines 1954. 8,960 miles
Estimated total for 1955. 11,400 miles

CRUDE LINES

According to reports received from virtually all of the major crude pipe line companies, about the same number of miles of crude lines will be laid in 1955 as in 1954. The only difference is that there probably will be more miles of gathering lines laid than miles of main line.

Some 2624 miles of main line and 2201 miles of crude gathering lines were constructed last year. This year's totals probably will run about 2300 miles of gathering system lines and 2200 miles of crude transmission lines.

Total U. S. crude lines 1954. 4825 miles
Estimated total 1955. . . . . 4500 miles

PRODUCT LINES

A total of 3960 miles of products lines were constructed in the U. S. last year. Surprisingly enough, this total includes 346 miles of gathering lines which are propane and butane lines.

Because product lines tie in so closely with competitive marketing, companies are reluctant to divulge plans for these lines, even in confidence. As a matter of fact, the total product lines which will be constructed this year is slightly less than 2000 miles according to the survey. However, most industry leaders think that products line construction this year will at least be equal to last year's. For this reason, PIPE LINE INDUSTRY estimates that 1955 construction will run 4000 miles.

Total U. S. Products Lines
1954 . . . . . 3960 miles
Estimated total 1955. . . . . 4000 miles

Pipe Line Contracts Not Let (Table Not Related to Above)

COMPANY	Length in Miles	Diameter	Type	Origin and Terminus	Estimated Cost	Status
Alabama-Tennessee Natural Gas Co.—Florence, Ala.	25	8, 12	Gas	Alabama	$808,450	Proposed
American Louisiana Pipe Line Co.—666 Penobscot Bldg., Detroit, Mich.	1,289	22, 30	Gas	North Tepetate, La.—Detroit, Mich.	$130 million	1,172 miles conditionally authorized
American Pipe Line Corp.—New York City (Swinerton & Walberg, Engineering)	1,425 plus 485 miles feeders & distribution lines	24, 26	Products	Beaumont, Texas area—Newark, N.J.	$170 million	Planned
Anadarko Basin Pipe Line Co.	525	24	Gas	Wise County, Texas—Texas Eastern near Memphis, Tenn.	.....	Planned
Arkansas-Louisiana Gas Co.	136	....	Gas	Arkansas, Louisiana and Texas	$9,245,166	Approved
Ar-Mex Pipe Line Co.	900	8, 12, 14	Crude	Guernsey, Wyo.—Phoenix, Ariz.	$31 million	Planned
Attock Oil Co.	60	....	Gas	Dhulian Field—Rawalpindi, West Pakistan	.....	Planned
California-Oregon Pipe Line System	103	6	Crude	Crescent City, Calif.—Medford, Ore.	$2 million	Planned

Table Continued on Page 42

Pipe Line Contracts Not Let—(Continued)

COMPANY	Length in Miles	Diameter	Type	Origin and Terminus	Estimated Cost	Status
Carolina Natural Gas Corp.—701 Wilder Bldg., Charlotte, N.C.	185	2, 12	Gas	North and South Carolina	.....	Proposed
Central Hudson Gas & Electric Co.	48	12	Gas	Albany—Kingston, N.Y.	.....	Applied to FPC
Cherokee Pipe Line Co.	8	....	Products	Near Wichita, Kansas	.....	Planned
Cities Service Gas Co.—1st National Bank Bldg., Oklahoma City, Okla.	33	20, 26	Gas	To replace lines in Kansas and Missouri	$1,860,000	Authorized
	13	....	Gas	Labette County, Kansas	$285,000	Authorized
	15.5	16	Gas	Carter County—Garvin County, Okla.	$541,050	Authorized
City of Dalton, Ga.	30	8	Gas	To connect with Southern Natural Gas Co. line	$2,940,000	Proposed
Coast Counties Gas & Electric Co.—369 Pine St., San Francisco	40	3, 4, 8	Gas	Coast and Valley region, Calif.	.....	Planned
Colorado Interstate Gas Co.	365	22	Gas	Rock Springs, Wyo.—Denver, Colo.	$23,299,000	Authorized
	115	4, 6, 8	Gas	Denver—Julesburg Basin—Basin Cities	.....	Before FPC
Colorado Western Pipe Line Co.—Dallas	708	....	Gas	Southeastern Colorado fields—Denver, plus laterals	$30 million	Planned
	328	16, 18	Gas	LaPlata County—Pueblo, Colorado Springs and Denver	$21,600,000	Authorized
Compania del Oleoducto Buenaventura—Cali, Colombia, S.A.	90	....	Products	Buenaventura—Cali, Colombia, S.A.	$4 million	Planned
Dixie Pipe Line Co.	20	8	Gas	Gwinville Field, Miss.—Transcontinental Gas line	$425,000	Proposed
El Paso Natural Gas Co.—Bassett Tower, El Paso, Tex.	32.5	10	Gas	Reagan and Upton counties, Texas	$799,000	Authorized
	74	....	Gas	Texas, New Mexico and Arizona	$13,800,000	Proposed
Empresa Nacional del Petroleo	80	6	Products	Concon—Santiago, Chile	.....	Planned
Gas Service Co.—Kansas City	12	....	Gas	To connect with Cities Service Gas Co. line	$650,000	Planned
Governments of Southern Rhodesia and Portuguese South Africa	200	....	Products	Beira, Portuguese Mozambique—Umtalia, Southern Rhodesia	.....	Considered
Hope Natural Gas Co.—445 W. Main St., Clarksburg, W. Va.	33	8, 10, 12	Gas	Wyoming County, W. Va.—Buchanan County, Va.	.....	Proposed
Houston Texas Gas & Oil Co.—4604 Main St., Houston	1,542	Various	Gas	Louisiana—Florida	$148 million	Proposed
Idaho Natural Gas Co.—Goodland, Kansas	....	....	Gas	Pacific Northwest line—points in Southern Idaho	.....	Proposed
International Pipe Line Co., Inc.—227 N. Colfax Ave., Minneapolis, Minn.	132	8	Products	Wrenshall, Minn.—Minneapolis Bulk Terminal	$4,250,000	Planned
Kansas-Nebraska Natural Gas Co.—Phillipsburg, Kansas	283	6-12	Gas	Central and northeast Nebraska	$4,096,890	Some contracts let
Lateral Gas Pipe Line Co.—Cedar Rapids, Iowa	27	4	Gas	Grant—Clarinda, Iowa	$267,000	Proposed
Malco Pipe Line, Inc.	91	6	Products	Prewitt, N.M.—Albuquerque	$1,250,000	Planned
Manufacturers Light and Heat Co.—Pittsburgh	53	....	Gas	13 projects in Ohio, Pennsylvania and West Virginia	$4,099,250	Authorized
Mayflower Pipe Line Co.-(Pine Tree Natural Gas Co.) —70 Pine St., New York, N.Y.	200	....	Products	New Jersey refining area—New England	.....	Planned
Michigan Consolidated Gas Co.—415 Clifford, Detroit	25.5	12	Gas	Sparta—Muskegon, Mich.	$13 million	Proposed
Michigan-Wisconsin Pipe Line Co.—500 Griswold, Detroit	252	4-24	Gas	Wisconsin	$11 million	Proposed
Missouri Central Gas Co.	25	6	Gas	Moberly—Macon, Mo.	.....	Proposed
Missouri Public Service Co.—Warrensburg, Mo.	136.4	8-10	Gas	New Franklin, Mo.—Grundy County, plus laterals	$5 million	Proposed
Montana-Dakota Utilities Co —Minneapolis	56	2, 4, 6	Gas	Hettinger and Stark counties, N.D.	$728,854	Authorized
Moore-Stoner Co.	200	6	Products	Glendive, Mont.—Minot, N.D.	$2,000,000	Planned
NATO	1920	4-10	Products	To serve military bases in Western Europe	.....	Foster-Wheeler Prime Contractors
Natural Gas Pipe Line Co. of America—20 N. Wacker Dr., Chicago	479	20, 26	Gas	Wise County, Texas—Fritch	$32,070,000	Before FPC
Natural Gas Producers, Inc.—Colorado Springs	61.8	12	Gas	Yenter Pool—Denver	$1,374,000	Planned
Nebraska Pipe Line Co.	220	6	Products	Cheyenne, Wyo.—North Platte, Neb.	$4 million	ODM certificate granted
New River Gas Co.	50	....	Gas	Summers-Monroe Counties, W. Va. and Narrows and Dublin, W. Va.	.....	Planned
NNCW Pipe Pine Co.—Dallas, Texas	127	8, 10	Crude	Clareton Field—Casper, Wyo.	$3.6 million	Planned
North Dakota Natural Gas Co.—St. Paul, Minn.	500	6, 10, 12	Gas	Tioga-Minot, Fessenden, Devils Lake and Fargo, N.D., plus 6" feeder lines	$10.8 million	Proposed
Northern Indiana Fuel & Light Co.—Auburn, Ind.	35	10	Gas	Edgerton—Auburn, Ind.	$876,814	Planned
Northern Natural Gas Co.—2223 Dodge St., Omaha	167	24	Gas	Farmington, Minn. to Duluth, Minn. and Superior, Wis.	$12 million	Before FPC
	329	2, 12	Gas	Sioux Falls to Aberdeen, S.D.	$6,661,100	Proposed
	310	24	Gas	Tioga to Fargo, N.D.	$18,494,000	Planned
	....	....	Gas	To interconnect with Natural Gas Pipe Line	$244,000	Planned
	403	24, 30	Gas	Emerson, Manitoba, Canada—Farmington, Minn.	$32,813,000	Before FPC
Northwestern Utilities, Ltd.—10124-104th St., Edmonton, Alberta, Canada	42	12	Gas	Bonnie Glen—Edmonton, Alberta	$1.4 million	Proposed
Pacific Northwest Pipe Line Corp.—M&M Bldg., Houston	1466 plus 443	Various	Gas	San Juan Basin—Pacific Northwestern states	$160 million	Approved
Pecos Growers Gas Co.	98	8, 12	Gas	Grandfalls, Texas—Reeves County, Texas	$2,500,000	Has ODM write-off
Petroargentina	370	16	Crude	Newguen—Bahia Blanca, Argentina	$40 million	Planned
Petroleos Mexicanos—Ave. Juarez, 94, Mexico City	440	20	Gas	Brazil—Tampico—Poza Rica, Mexico	.....	Planned
	260	6, 8	Products	Lagos, Mexico—Guadalajara, Aguascalientes and Salamanca	.....	Planned
	145	12	Crude	18 de Marzo Field—Monterrey, Mexico	.....	Considered
	72	12	Crude	Poza Rica—Atzacapotzalco, Mexico	.....	Proposed
Phillips Petroleum Co.—Bartlesville	54	6	Products	Goldsmith—Borger, Texas	.....	Planned
Pine Tree Natural Gas Co.	204	8, 10	Gas	Boston area—Bangor, Maine	.....	Planned
Progress Pacific Pipe Line Co.—530 W. 6th St., Los Angeles	1100	24	Crude	Odessa, Texas—Los Angeles Harbor	.....	Planned
Santos Jundiai Railway Co —Brazil	....	8, 14, 22	Crude & Products	Expansion of Santos—Sao Paulo system	$5 million	Planned
Shenandoah Gas Co.—Lynchburg, Va.	40	3, 4, 8	Gas	Virginia Gas Transmission Co. System—Virginia and West Virginia towns	$1,470,000	Authorized
Sioux Oil Co.	50	....	Products	Newcastle, Wyo.—Rapid City, N.D.	$1 million	Planned
Sturgeon Pipe Line, Ltd.	100	12	.....	Sturgeon Lake Field—Trans-Mountain system	$6,500,000	Planned
Sunflower Pipe Line Co.—Tulsa, Okla.	265	3-6	Products	Kearny, Grant and Haskel Counties, Kansas—Wichita, Kansas	$3.5 million	Authorized
Tennessee Gas Transmission Co.—Box 2511, Houston	50	10	Gas	Nueces County, Texas	.....	Proposed
	243	24	Gas	Hebron Storage Field, Pa.—Greenwich, Conn.	.....	Proposed
Texas Eastern Transmission Corp.—Texas Eastern Bldg., Shreveport, La.	481	16, 24, 26	Products	Reconvert "Little Big Inch" line and construct 382 miles of additional line	$7,114,000	Proposed
Texas Gas Corp.—Shreveport, La.	3.5	12	Gas	Sabine River crossing to join Transcontinental Gas Pipe Line	.....	Proposed
Texas Gas Transmission Co.—416 W. 3rd St., Owensboro, Ky.	81	20, 26	Gas	Looping portion of Louisiana-Tennessee Line plus 100 miles smaller lines in Southern Indiana	$17.5 million	Proposed
Trans-Canada Pipe Line, Ltd.—Calgary, Alberta	2240	30, 36	Gas	Alberta—Eastern Canada	$297 million	Approved
Transcontinental Gas Pipe Line Corp.—3100 Travis St., Houston	....	....	Gas	Connecting facilities with Texas Eastern Penn-Jersey in Pennsylvania and New Jersey	$131,628	Authorized
	361.5	30, 36	Gas	Paralleling portions of Texas-New York line	$48,205,000	Proposed
	25	12	Gas	Cameron and Calcasieu parishes, La.	$1,076,000	Proposed
Trans-Northwest Gas, Inc.	246	....	Gas	Onoyoos, B.C.—Washington and Idaho, plus 275 miles branch lines	.....	Planned
Triangle Pipe Line Co.	500	12	Products	Arkansas City, Ark.—Covington, Ky.	$24.5 million	Proposed
Union Oil Co. of Canada, Ltd.—Chatham, Ontario	180	24	Gas	Dawn Gas Field to Lamberton County to deliver gas to Dominion Gas Co.	.....	Planned
United Fuel Gas Co.	13	12, 20	.....	West Virginia	.....	Before FPC
U. S. Navy	600	10	Products	Under study to supply naval and air bases in Spain	$16 million	Planned
U. S. Navy	450	8	Gas	Gubik Field—Fairbanks, Alaska	$20 million	Planned
Utah Natural Gas Co.	40	16	Gas	Orem—Salt Lake City, Utah	.....	Planned
Virginia Natural Gas Co.	153	....	Gas	Buckingham—Richmond and Portsmouth, Va.	.....	Planned
West Coast Pipe Line Co.—Mercantile Bank Bldg., Dallas	960	24, 26	Crude	Wink, Texas—Norwalk, Calif.	$106 million	Planned
Winnipeg and Central Gas Co.	450	4-8	Products	Tioga, N.D.—Winnipeg, Canada	$20 million	Planned
Wyoming Gas Products Corp.	....	....	Gas	Gathering system in Weston County, Wyo. to feed gasoline plant	.....	Planned
Yacimientos Petroliferos Fiscales Bolivianos	170	4	Crude	Bermejo—Tupinsa, Bolivia	.....	Planned

Rules of Thumb

FOR THE PIPELINER'S NOTEBOOK

$15 Per Rule of Thumb

These formulae from the pages of engineers' own notebooks yield rough, but reasonably accurate answers for design, maintenance and supply questions. The Editors will pay $15 for your pet Rule of Thumb. Send your Rule of Thumb to Donald M. Taylor, Editor, PIPE LINE INDUSTRY, P. O. Box 2608, Houston 1.

Engineering Design —19—How to determine the length of a pipe bend.

For smooth bends (other than wrinkle bends) use the following formula:

$L = R \times D \times .017 + T$

Where L = length of bend
R = radius of bend (center line of pipe)
D = number of degrees in the bend
T = total length of the two tangents at either end.

Example: Find the length of a piece of pipe required to make a 90° bend with a radius of 60 inches. There's to be a four-inch tangent at either end.

L = ?
R = 60
D = 90
T = 8
L = 60 x 90 x .01745 + 8
= 94.23 + 8
= 102.23 inches

Engineering Design —20—How to determine the length of pipe required for a wrinkle bend.

Length = Degree of Bend x Outside Radius x .01745

$$\text{Number of wrinkles} = \frac{\text{Degrees of Bend}}{\text{Degrees per Wrinkle}}$$

$$\text{Wrinkle Spacing} = \frac{\text{Length of Bend}}{\text{Number of Wrinkles}}$$

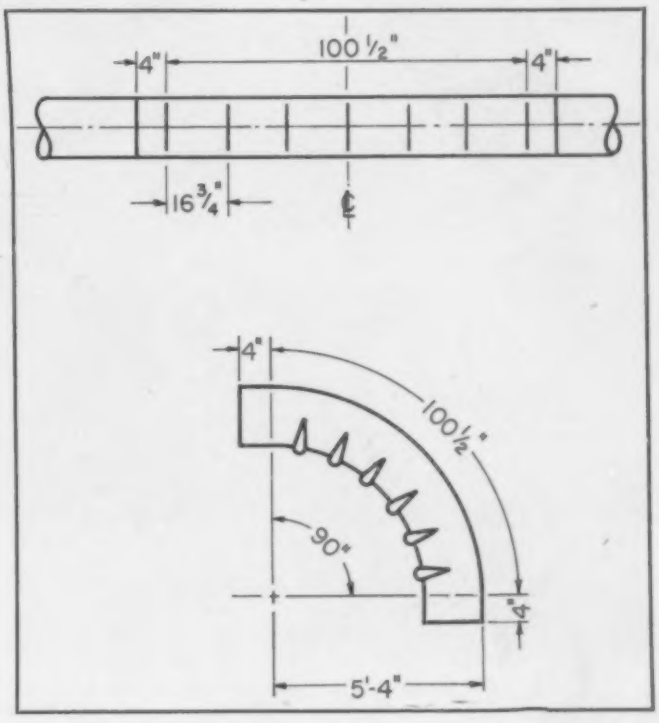
Example: What is the length of pipe required to fabricate a 90° wrinkle bend, using an outside radius of 5 feet 4 inches, and using 15° wrinkles and two 4-inch tangents?

Length of Bend = 90 x 64 x .01745
= 100.5 inches

$$\text{Number of Wrinkles} = \frac{90}{15}$$
= 6

$$\text{Wrinkle spacing} = \frac{100.5}{6}$$
= 16¾ inches

Total length of pipe = 100.5 + 8
= 108.5 inches



LARGEST DIAMETER CROSS-COUNTRY GAS LINE LAID IN 1954. The 36-inch line belongs to Transcontinental Gas Pipe Line Corporation, which also pioneered the 30-inch cross-country line some years ago. Many new ideas were incorporated in laying the line. But the most radical departure from conventional practice was laying the line by the sewer-pipe method, joint-by-joint in the ditch. This is the oldest method of laying pipe—and it may be the most inexpensive for big-inch construction.

(See next page.)

New Ideas Highlighted '54 Construction

By **DONALD M. TAYLOR,** Editor, PIPE LINE INDUSTRY

IT IS SURPRISING that any operation so simple as pipe line construction can be improved on year after year. Reduced to its essentials, even a 10-year-old child can understand pipe laying. The pipe is simply welded together, coated, lowered in the ditch, and covered up.

Yet, despite this simplicity, pipe line construction methods are improved year after year. And 1954 was no exception. Pipe was **laid faster** than ever before. The **largest diameter** cross country transmission line was laid. And taking the year's construction as a whole, pipe was **laid cheaper than ever before.**

On the following pages, PIPE LINE INDUSTRY presents some of the highlights that contributed to the excellent record in 1954.

1. Sewer-type method of pipe laying is revived . . .

SOME OF THE engineers in the pipe line industry are excited over the oldest known method of underground pipe line construction—the sewer pipe method. This is a joint-by-joint operation as old as the first pipe line, and so far as the gas and oil pipe line industry is concerned, it was more or less shelved many years ago.

Yet, some of the gas company engineers claim that in flat country areas pipe 26 inches and larger in diameter can be laid cheaper by this method than by conventional methods—provided (1) speed is not too important, and (2) pipe of 60-foot random length can be obtained.

These claims are well founded. By the sewer pipe method, about one third less men and equipment are required on the spread. The pipe is yard-coated, strung on the right-of-way and carefully measured. Ditches are cut with bell holes at the end of every joint. Next, the coated pipe is bent, jeeped and the holidays in the coating repaired. It is lowered into the ditch joint at a time, and after it has been welded, the pipe is coated at the weld area and backfilled.

The conventional lowering-in is eliminated as is the traveling coating and wrapping operation.

Credit for dusting off this old method goes to Pacific Gas and Electric Company, which used the method to lay 34-inch pipe in California; to Transcontinental Gas Pipe Line Corporation and Associated Pipe Line Contractors, which used this method to lay 48 miles of 36-inch line in Mississippi and Alabama this past summer.

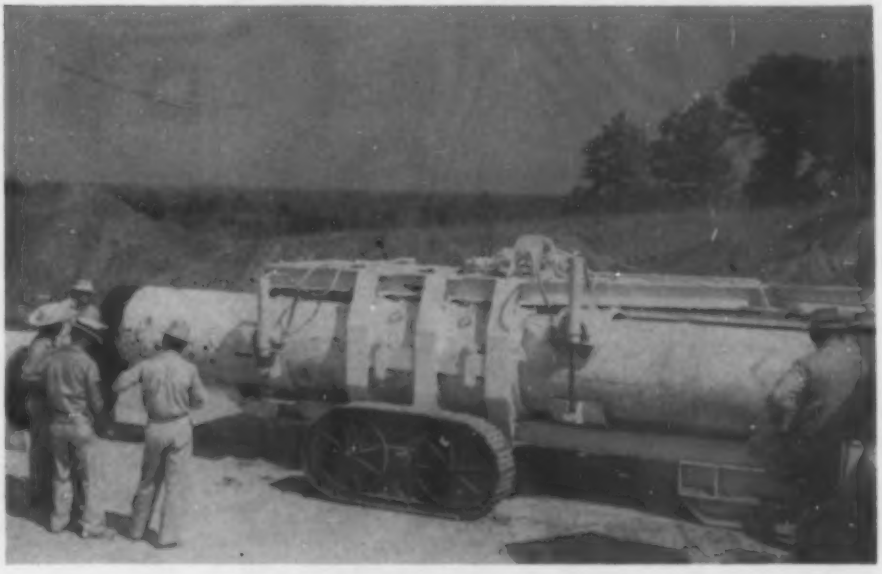
More details on the sewer-pipe method can be found in the November, 1954, PIPE LINE INDUSTRY and in the May, 1954, issue of *World Oil.*

2. Bending of coated pipe opens up new vistas . . .

IN RECENT YEARS asphalt coatings have been developed which can withstand the terrific forces of a bending machine without undue cracking and damage. This makes it possible to bend pipe successfully after it has been coated. This in turn, makes it practical to lay big-inch pipe by the sewer-piping method.

The pipe bender shown here is bending 36-inch, .406 wall pipe on Transcontinental Gas Pipe Line Company's Alabama loop. This bender can get a maximum of 18 degrees of bend per 40-foot joint of pipe.

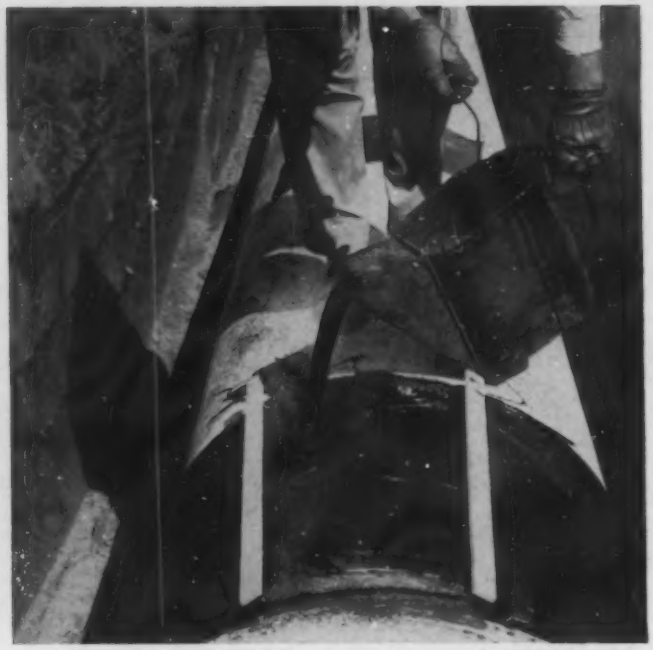
But bending of pipe after coating was not limited to the largest diameter lines. Magnolia Pipe Line Company yard-coated about 113 miles of its 20-inch Corsicana-to-Beaumont line.



Pipe bender in action on Transcontinental's Alabama loop.

Continued on Page 46

Wrapper banded on pipe . . .



Dope poured into opening.

3. New wrap-around form makes weld coating easy . . .

A VERSION of the old cigarette wrap has made its appearance on the pipe line right-of-way. It is used to form the coating at the weld area on pre-coated pipe. But instead of the old "granny rag," there's a plastic impregnated wrapper that rides around the pipe on felt strips which rest on the coating.

After the form has been banded in place with steel bands, the dope is poured down one side until it floods around the pipe and comes up on the other side. Then the open section of pipe is coated with two flood coats of dope. The form which is treated so that it will not form steam bubbles, is left in place.

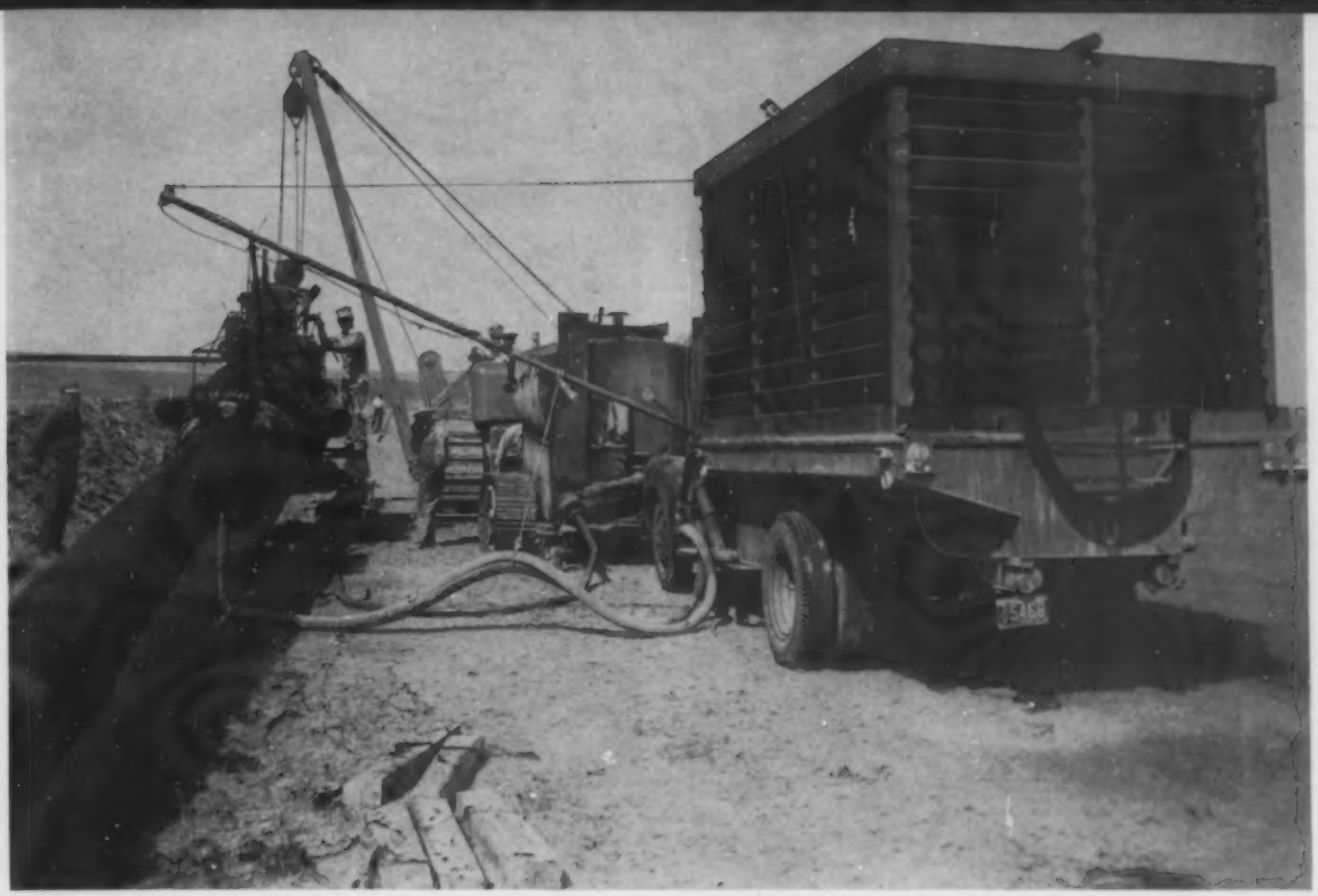
4. Tailor-made weights speed 36-inch construction . . .

Concrete blocks placed on Transco's 36-inch line.

CONCRETE WEIGHTS have been used in pipe line construction before, but never in such large sizes as on Transco's 36-inch line. Because this mammoth pipe has a positive buoyancy of almost 300 pounds per foot in water, it must be weighted down securely in areas subject to flood.

To speed this task, Transco engineers specified "U" shaped blocks which could be lowered on top of the pipe by an ordinary side-boom or winch truck. The proper negative buoyancy could be controlled by the spacing of the blocks.

For river crossings, wrap-around concrete weights were clamped around the pipe and bolted. A portion of the weights were formed with rock-shield cast in them to protect the coating of the pipe. In most cases, the rock shield was simply slipped over the pipe before the weights were lowered onto it.



PORTABLE COOLING TOWER that travels down the line floods 300 gallons of water per minute onto hot dope. This eliminates skid marks after coating.

5. Cooling water sets dope; pipe laid directly in ditch

A PORTABLE COOLING TOWER that travels down the right-of-way was used on one of H. B. Zachry Company spreads in laying a 20-inch line recently. From this tower, 300 gallons of water per minute is circulated over the line, cooling the dope so that the pipe can be lowered-in the ditch immediately after coating. Developers of the tower estimate that the water cools the dope about 300° (from 450° to 150°) at the rate of 60 feet per minute, depending on weather conditions and ambient temperatures.

This cooling has several advantages, according to the inventors of the new tower. It eliminates the exterior cooling that causes a certain amount of shrinkage and applies a small amount of external force giving the coating a better bond. It eliminates sagging—even on a 5/32-inch coating.

Laying the pipe directly in the ditch eliminates skid marks and coating damage.

Here's the way the tower assembly works. Normally it carries about 10 barrels of water, and two pumps circulate water from the tower to a six-foot-long cooling jacket that has spray nozzles that evenly cover the pipe. After water has passed over the pipe it is re-circulated through the tower. The main water loss comes from evaporation. This seldom exceeds 20 barrels per day.

Continued on Page 48

GYROSCOPIC COMPASS, inclinometer and camera in 16-inch.

GO-DEVIL ENTERS lines. Casters have not yet turned.

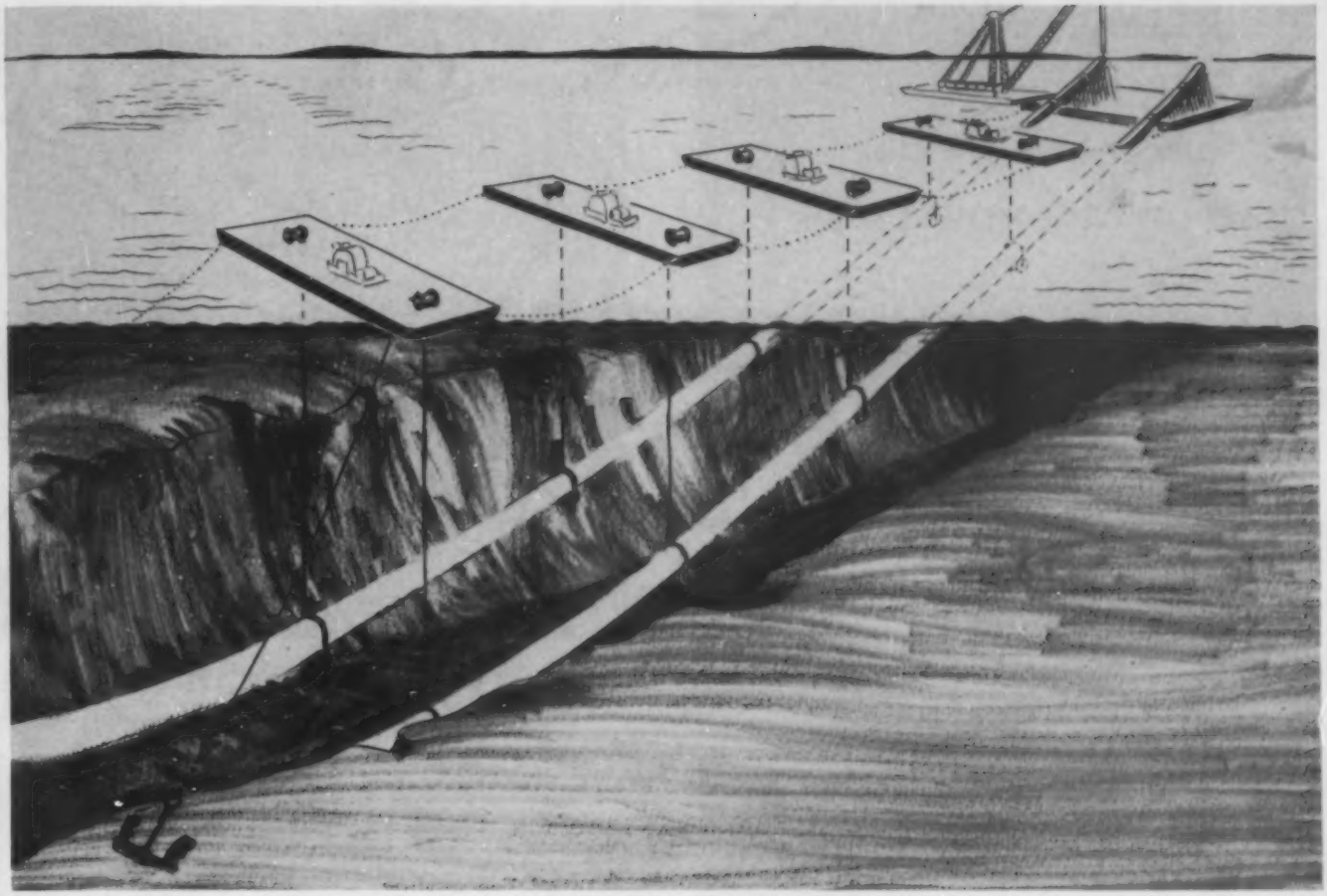
6. Locating pipe lines under river beds . . .

ONE OF THE EXPERIMENTS under way this past year had to do with the application of oil well surveying methods to the location of pipe lines under river beds. Two new 24-inch lines, located by divers, etc., were surveyed from the inside by a gyroscopic compass and an inclinometer mounted in a six-foot length of 16-inch pipe.

This go-devil which traveled on casters, was pulled through the river crossings by cables attached to drums on either shore. Every 40 feet the instrument was stopped and pictures of the compass face, inclinometer vernier were taken. From these readings the location of the line was plotted.

Because the instrument is still in the developmental stage, the limits of its accuracy have not yet been determined.

EXPERIMENT ON LINE where location was known positively. Device travels down the pipe 40 feet at a time. It stops while automatic camera takes photo of vernier on inclinometer and face of gyro compass. From these photographs, line location is plotted.



7. New lowering-in barges put into use . . .

NOT ONE—BUT MANY new ideas were employed by Missouri Valley Dredging Company in laying twin Mississippi River crossings this past summer. Several new ideas were incorporated in new lowering-in barges shown here schematically.

These barges support the spans of pipe from the ramp-barge to ditch bottom. Their purpose is to protect the pipe and coating by keeping the pipe outside minimum bending radius.

As the pipe rolls down the ramp-barge to the bottom of the ditch, it is supported at four points by rubber-tired dollies hanging from the lowering-in barges. In contrast with most lowering-in barges, the wire-rope which supports the dollies runs from a winch drum through a well in the barge—rather than over the end of the barge. This gives the vessel additional stability and minimizes the effects of wind and waves on the lowering-in operation.

The four barges are coupled together so they move as a single unit. The after barge has anchors that prevent the barges from creeping up the pipe faster than it comes off the ramp.

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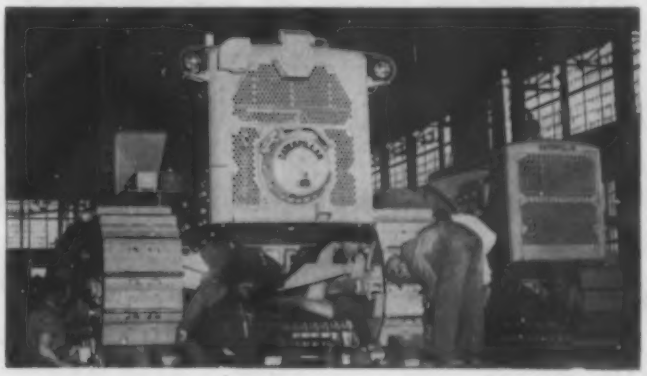
8. New heavy tractor being field tested . . .

A PIECE OF EQUIPMENT is seldom too big for a pipe line job. But very often equipment will be too small, and when it is, maintenance shoots up and breakdowns are frequent.

For this reason, pipe line contractors are eagerly awaiting the results of field tests on the biggest tractor yet. Shown here, it is being readied for shipment. Notice how the heavyweight D9X at left compares with the D8 at right.



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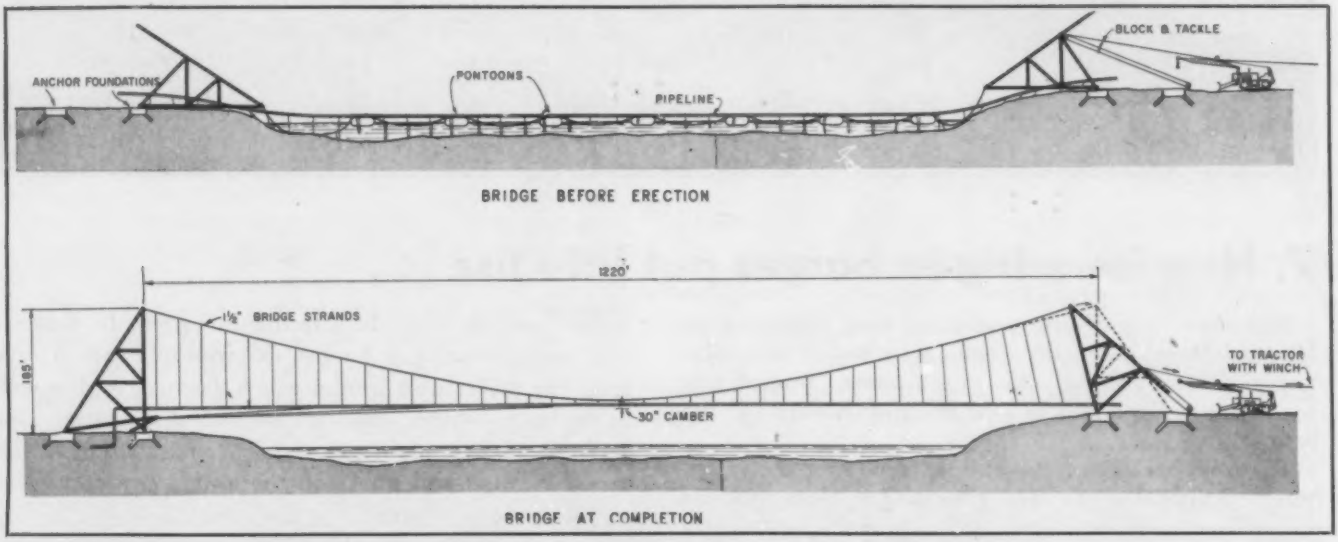
9. Automatic welder used on aluminum pipe . . .

Automatic welder in use on Reynolds line.

WHILE THE ALUMINUM welding process requires no flux and no cleaning of the weld between passes, it does require that the arc be blanketed by a continuous stream of inert gas. This makes manual welding in the wind very difficult.

The automatic welding machine shown here was developed specifically for welding aluminum pipe. It was used last March to weld Reynolds Metals Company's 12-mile, 8-inch gas line on the Texas Gulf Coast. With the exception of an aerial crossing which failed in fatigue induced by vibration, the line has proved serviceable for high-pressure gas transmission. (See April, 1954, WORLD OIL.)



10. Suspension bridge erected in one hour . . .

THE CLEAR SPAN ENGINEERING COMPANY, INC., of Houston has developed an aerial pipe line suspension bridge for river crossings that can be made up on shore, floated across the water on pontoons and then erected in about an hour's time. The two towers serve as gin poles to hoist the bridge aloft. Seven of these new bridges were installed on the Yellowstone Pipe Line Company system completed recently. (See page 72.)

Because of the simple design and ease of construction the bridge can be completed in about three weeks by an eight-man crew.

One of the chief advantages of this type construction is that it lends itself to easy engineering analysis.

11. Compressed air used to test big-inch line . . .

THE RECENTLY COMPLETED Gulf Interstate Gas Company system was the first big-inch system to be completely cleaned and tested with compressed air.

According to Gulf Interstate engineers, air offers several advantages over other methods of testing newly-laid lines. The advantage over hydrostatic testing is that it leaves the line dry at the end of the tests.

The company used two crews for this work. Each one was equipped with nine air compressors which had a total of about 800 horsepower. To conserve the compressed air, engineers used air from tested sections to clean and test other sections.

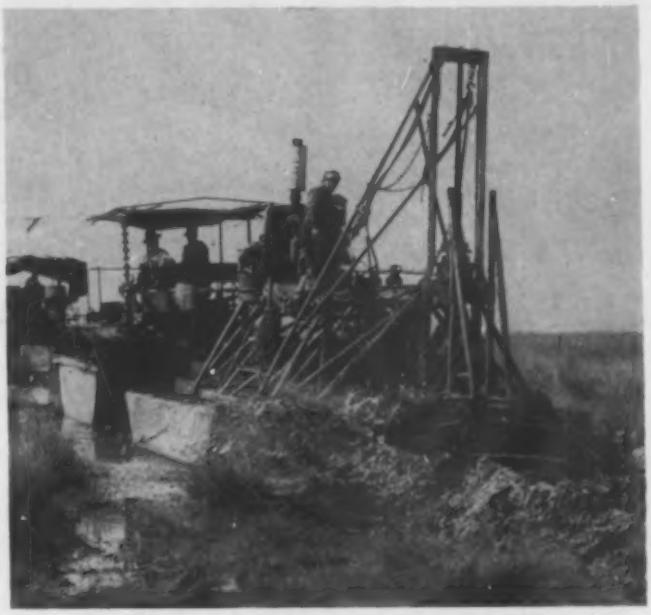
12. Helicopters speed up surveying in marshes . . .

USING HELICOPTERS, survey parties can make four to eight times normal speed through the marshes of South Louisiana, and they can cover 8000 feet per shot instead of the usual 1000. The instrument man takes a back sight on the helicopter hovering over the instrument point 8000 feet back, then, using radio and visual means, he lines the helicopter up on the next point about 8000 feet ahead. The helicopter can even drag the chain and fly the tower from point to point.

Handy helicopter stands by in the background.

13. New ditcher used in Louisiana swamplands . . .

A NEW CONTRAPTION appropriately dubbed the "egg beater" can cut from 5000 to 7000 feet of ditch per day through the marshes of south Louisiana. The machine's principle of operation is simple. At the ditching end, there is a barrel-like cylinder that hangs down to the bottom of the ditch. In operation, it rotates at high speed and steel blades on the cylinder's side sling the mud, water and grass from the ditch. One of the main advantages of using this machine is that the spoil from the ditch is left on the side, permitting the ditch to be backfilled.



The "egg-beater" ditches Louisiana marshes.

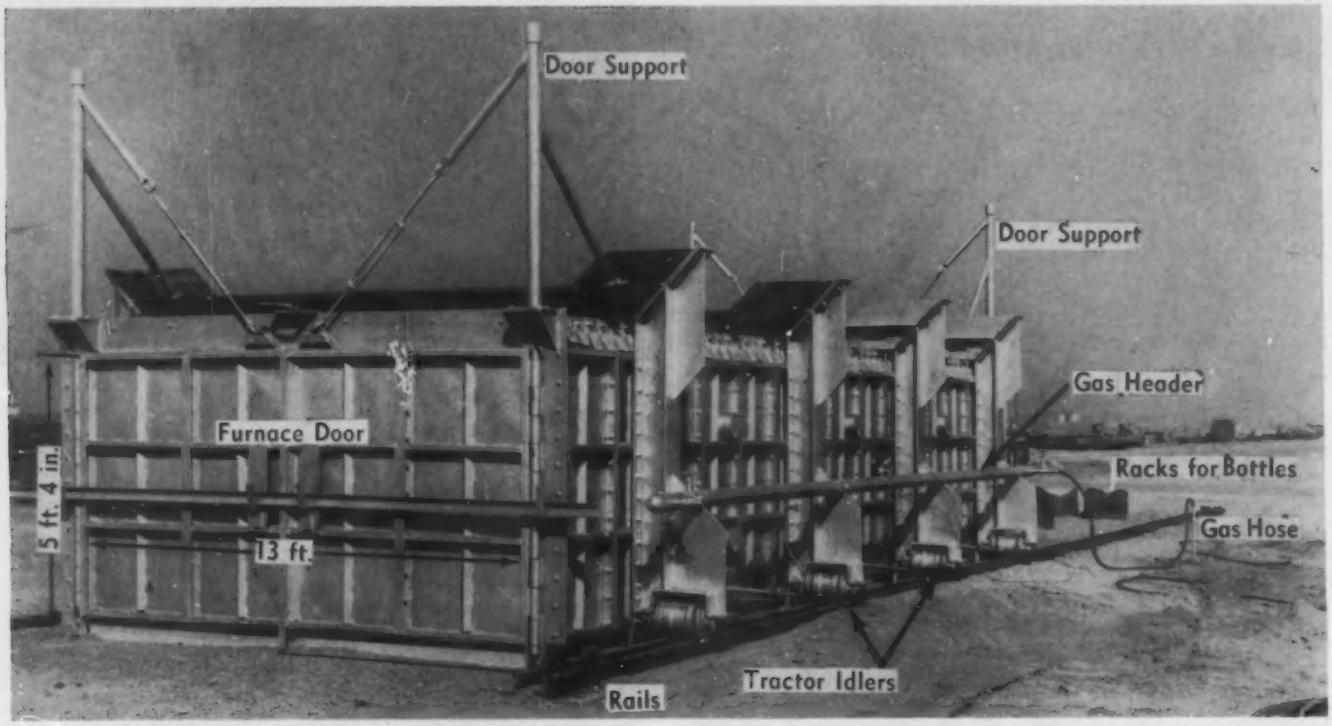
14. Pneumatic saw bevels pipe inside and out . . .

A PNEUMATIC PIPE SAW that has an internal beveling attachment saved Gulf Interstate Gas Company the time and expense of installing transition pieces between ½-inch wall pipe and ⅜-inch wall pipe on construction of the new Louisiana to Kentucky system.

Ordinarily when pipe of different wall thickness is welded, it leaves a ridge in the line. The sharp angle where the two pieces of pipe join can cause stress concentration which can result in line failure. To minimize this, designers have been calling for transition pieces between the two sections. But this combination saw, beveling machine can make the transition piece right in the field in a few minutes time.

Pipe saw with internal beveling attachment.

Continued on Page 52



15. Portable furnace removes welding stresses on job . . .

EL PASO NATURAL is using a rail-mounted furnace to take welding stresses out of compressor bottles and headers that are fabricated on some of its compressor plant construction jobs. The furnace is made of panels which can be shipped by rail or truck and assembled on the job. The assembly is mounted on 72-foot-long rails which support it on either side. This permits workmen to place bottles and headers which are to be heat treated on the racks and move the furnace over them.

While one batch of work is being heat treated inside the furnace at one end of the rack, untreated bottles and headers are moved on the racks spaced between rails at the opposite end. When one job is finished, the furnace can be moved over the untreated work while it is still hot. This saves time and fuel.

Headers and bottles less than one inch thick are heated to 1150° F. and held at this temperature for one hour. Headers made of thicker material are "soaked" for longer periods. It usually requires two hours and 15 minutes for the furnace to reach the maximum temperature and about the same length of time for it to cool.

16. Internal coating protects pipe in storage . . .

A NEW STATIONARY OR YARD-TYPE MACHINE has been developed to wire-brush and spray-coat the inside of large diameter pipe. The joint being processed is held in place and the cleaning machine, driven by a diesel engine, pushes the rotating head, which is mounted with wire brushes and spray nozzles, through the pipe. Air from a compressor, on the same carriage as the diesel, jets out the rust and foreign matter and supplies energy for the spray nozzles. —**The End**

Pipe at top left cleaned, coated by new machine.

You Asked About Corrosion . . .

MARSHALL E. PARKER

• What records should be kept to expedite a good corrosion mitigation program?

By **MARSHALL E. PARKER,** Consulting Corrosion Engineer

A.—Records in conjunction with a corrosion program may be divided into two classes: records kept in order to evaluate a corrosion problem, and records kept in order to expedite a mitigation program. In the first category are, primarily; construction data on all of the lines comprising a system, giving pipe weights, type of joints, and kind and amount of coating; and, most important of all, leak records. Included with the latter should be the reports of any inspections which may have been made, including inspections when the line had to be uncovered for some other reason.

When a line not under cathodic protection has been in operation for a number of years, and has experienced numerous leaks, a complete record of these is of utmost value to the corrosion engineer. In the first place, they make it possible for him to "sell" management on the idea that something out to be done. They make it possible for him to estimate the cost of corrosion losses, and thus to estimate the savings which may accrue to an effective program of prevention. And, finally, they pinpoint more accurately than any kind of survey the most viciously corrosive areas in his system.

If a line of any appreciable length, with any kind of coating, or even any combination of different coatings, is laid in any kind of soil or soils, and then permitted to endure the corrosive attack with no remedial steps being taken except the repair of leaks, then the rate of leak occurrence will follow a statistical law; this has been demonstrated, both by mathematical analysis and by experience, to be of exponential form. This means that if the cumulative number of leaks is plotted against time from the beginning of exposure, on logarithmic paper, the resultant curve will be a straight line. With a composite system, consisting of different sections laid at different times, it is difficult to establish the correct "epoch" or beginning time for the curve; for this, and other reasons, it has become customary to use semi-logarithmic paper, with a uniform time-scale, rather than true logarithmic paper; rarely is the departure enough to be significant.

It is strongly recommended to any starting corrosion engineer that he make every effort to assemble all such data as may be available, and to plot them on semi-log charts as soon as possible; this should be his number one priority project. Such charts should be compiled for each section, and for the entire system. If the total number of leaks is as high as 10 or 20, then the projected curve can be expected to be statistically significant. Then, when cathodic protection is applied to some portion of the system, a sectional chart will show clearly and convincingly what is to be expected; what will occur without further protection, and how much can be saved by extending the installations.

There is no more striking presentation than a pair of these curves; one showing the actual record of a line or a segment, operating unimpeded and showing a clear-cut straight line on semi-log paper (the record used need not be one of the company's own lines); the other, a similar curve in its beginning, but flattened almost or entirely horizontal by the successful application of cathodic protection. If the anticipated leak frequency is then shown on the first curve by a projected dotted line, a comparison of the costs for the number of leaks which could have been expected with the actual cost of the protective system applied will present a most convincing case for management's consideration.

Other records which will be of value to the corrosion engineer at this stage of the problem include: records which show the exact location of all leaks experienced, and are correlated with measurements taken of soil resistivity (these are of primary importance when the line in question is bare or poorly coated, and thus will probably be subject to partial rather than complete protection;) records of all cathodic protection installations on paralleling or crossing lines, which will be needed for interference studies; records of all coating repairs or of reconditioned sections of the subject line, since these may explain comparative freedom from leaks in areas otherwise indicated as being very troublesome (ignorance of such specially coated sections has proved very embarrassing more than once.)

A subsequent column (probably the next) will deal with records kept to expedite a corrosion mitigation program, and will include some specimen forms for the keeping of such records. —**The End**

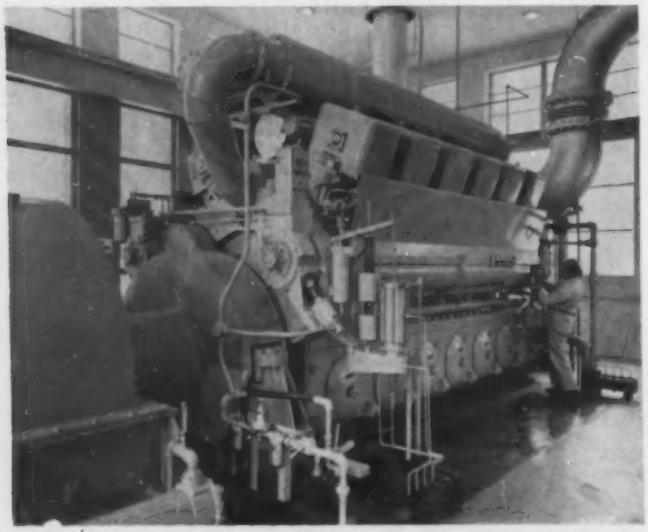
New Technical Developments of 1954

Here are eight ideas which were proven by use during the year just past. Some are not brand-new. Some not fully developed. But they are working well.

- **Remotely-operated diesel station**
- **New-type controller**
- **Stream blending**
- **Large-capacity meter-prover**
- **Semi-automatic main-line compressor station**
- **Pulsation dampener**
- **Batch detection by capacitance recorder**
- **Shipping natural gas by barge**

THE YEAR 1954, like its immediate predecessors, saw many new ideas conceived for technological improvements in pipelining. It also saw a number of ideas, a few months or a few years old, developed into practical application—and an even larger number, no doubt, abandoned as unworkable.

Here are eight ideas which, during the year just past, reached the stage of actual, proven use. These are not brand-new ideas, just hatched out and still in pinfeathers; neither can they be said to be fully developed as yet. But they are all working, and working well.



LARGEST DIESEL ENGINE in pipe line service at Vicksburg, Mich.

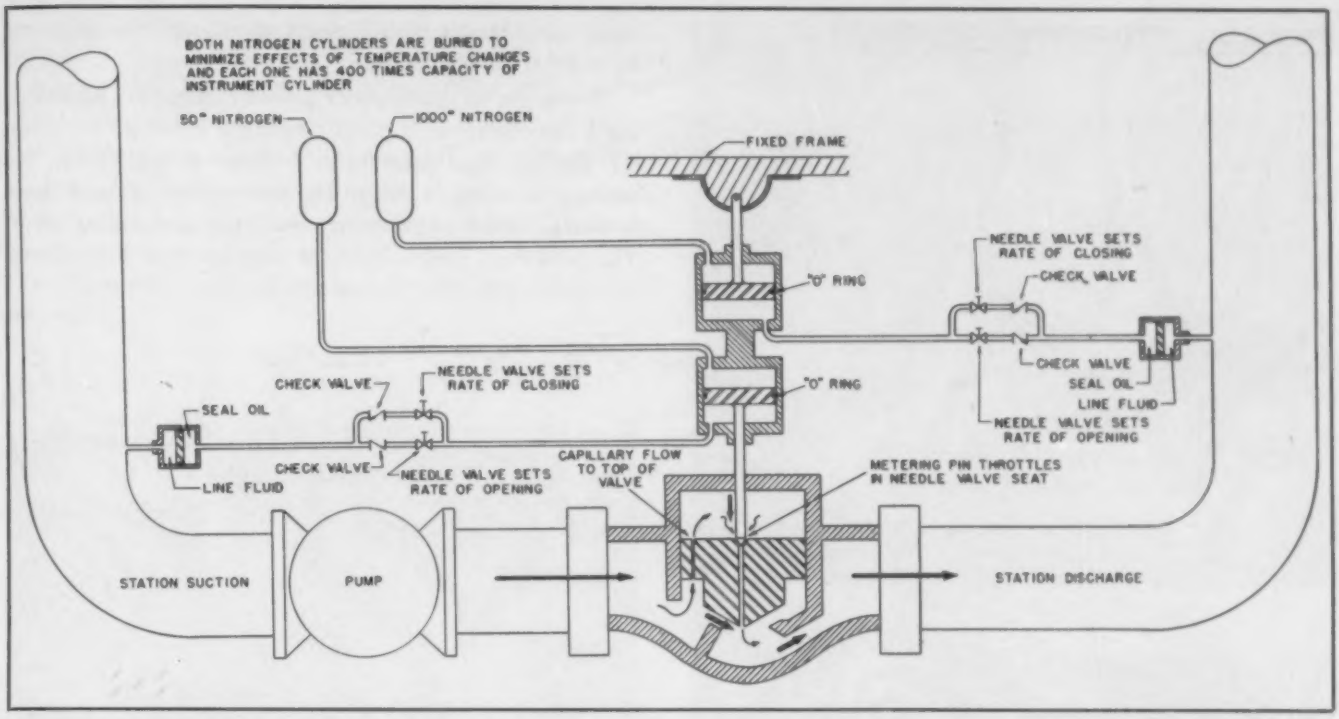
1. Remotely-operated diesel station . . .

THE WOVERINE PIPE LINE SYSTEM consists of 295 miles of 16-inch products line, originating in Hammond, Ind., and having terminals in Detroit and Toledo. There are two pump stations on the line; one, the Kennedy Avenue station, at the origin, and a second, the Vicksburg station, a little more than 100 miles away. The dispatching for the system is done under contract by Shell Products Pipe Line Department, from a dispatching room in New York City.

Both stations are equipped with pushbutton controls over all valves, and single-button automatic starting and shutdown of pumps. Furthermore, the Kennedy operator can extend his control to the equipment at the Vicksburg station via teleprinter. Dialing of a code number from Kennedy will start or stop the single pump at Vicksburg. Other code numbers will furnish automatic reports on operating conditions at the distant station.

The equipment which is thus remotely controlled is a two-stage centrifugal pump, powered by a diesel—the largest of its kind ever installed on a pipe line. The engine has 12 cylinders of 13-inch bore and 16½-inch stroke. It is four-cycle, and develops rated horsepower at 500 revolutions per minute. Featuring high pressure turbocharging, intercooling and variable compression ratio, it is rated at 2650 brake horsepower. It is presently operating at 2000, the intercooling being omitted. When this is added later, together with a 3-to-1 pressure ratio turbocharger, the rating will be increased to 3200 hp.

The system for the automatic starting, which can be actuated remotely from Kennedy or by the local operators, is similar to that employed on Shell's North Line from Wood River to East Chicago. As soon as the motor actuated main valves are open and pump seal and lubricating oil circulation is established, the start cylinder receives air through a solenoid valve, extending its piston to open the fuel rack as starting air is admitted to the engine. When the engine fires, establishing a pressure differential across the pump, a solenoid valve admits air to the idle cylinder, retracting the fuel rack to idle position. Following an electrically timed delay, the air is released at a controlled rate, permitting the engine to shift from idle to control speed in about five minutes. This sequence permits proper warm-up of a cold engine and a gradual load application.



SCHEMATIC DRAWING OF CONTROLLER. Capillary flow to upper portion valve is around sides of the plug instead of as shown.

2. New-type controller . . .

A NEW AND HIGHLY SENSITIVE control system has been developed for flow and pressure control in a closed products pipe line system. Even manually introduced abnormal upsets in the system have failed to make this device hunt or cycle, and the control achieved is so close (4 pounds per square inch on 1200 psi discharge) that it is difficult to obtain charts showing the action.

The instrument operates by balancing bottled nitrogen, at the desired suction and discharge pressures, against the pressures themselves. This is done in a pair of back-to-back cylinders; one piston rod is fixed and the other actuates a metering pin seated in the main discharge valve piston. Manually adjustable needle valves in the lines from suction and discharge pressure, respectively, permit accurate and independent adjustment of the opening and closing rates. The absence of springs means that the sensitivity is practically constant throughout the entire range; the variation in nitrogen pressure is less than ¼ of 1 percent for full travel.

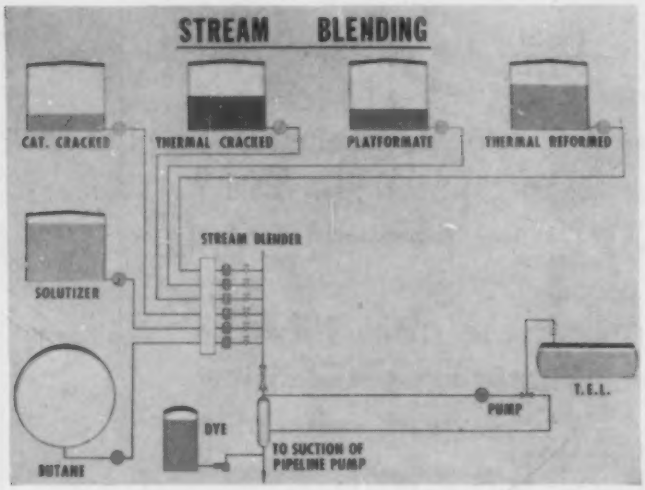
The direct approach—controlling pressure by pressure—used in this design makes it possible to obtain extreme sensitivity without any hunting; to eliminate reset functions; and to dispense with any anticipatory or preact accessories. It is readily adapted to diesel as well as electric prime movers, and is fully compatible with automatic starting and with safety control devices. Control lines can be installed in hazardous locations, since they need only contain fire-safe hydraulic fluids; the pipe line fluid is present only in the master controller.

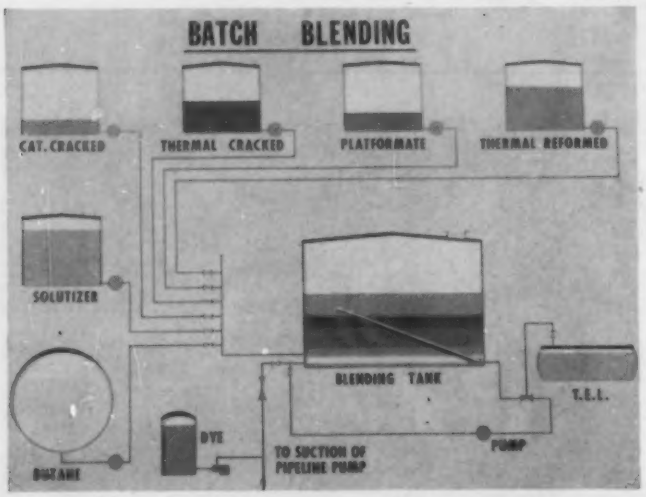
VALVE ON 14-INCH DISCHARGE. Normally controlled by station discharge, 50 pounds per square inch suction or lower will take over as will excess flow.

3. Stream blending . . .

A NEW STEP in automation has been made by Shell Oil Company, in the development of a continuous gasoline blending process, whereby the components are simply fed into a section of pipeline in accurately proportioned quantities. The design of a system to do this, particularly at the varying total quantity rates needed for pipeline operation, called for some intricate and ingenious controls. Over-all control is obtained by automatic comparison of the actual blend with the desired specifications.

Among the obvious advantages to be had by such a system are the savings in space by the elimination of batch tankage, and the savings in labor by the automa-



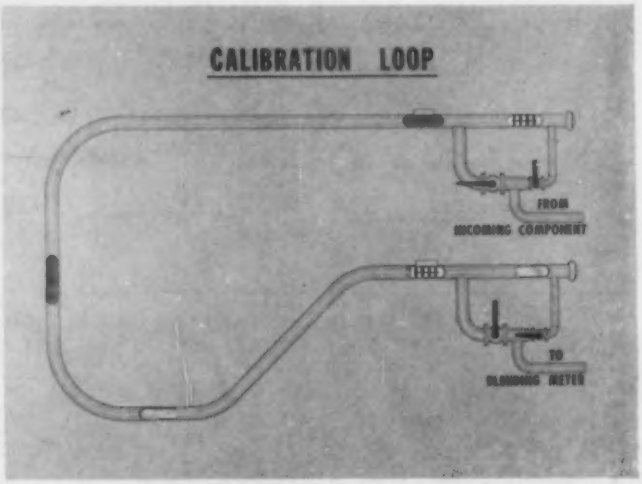


tion involved. A less obvious gain is the flexibility of the system; short-notice changes in specifications are handled readily.

Positive displacement meters are used in order to meet the high precision demanded under the varying flow rates imposed by the direct pipe line connection. The heart of the system is a master computer, consisting essentially of a line shaft whose speed is governed by the pipeline flow rate demanded. This shaft drives the six controllers which proportion the components. Meters in each component stream operate, by pneumatic controls, through these individual computers, to govern the component flow rate through throttling valves. Included are numerous monitoring switches and controls which signal any failures; at the same time "memory" totalizers record any excess or shortage of any component, so that, if there has been only a short run of off-specification product, it can be corrected in the next few minutes. There have been a few such incidents in the nine months in which the system has operated, and in every case batch specifications were successfully met.

When not in operation because the pipe line is carrying some other product, the blender can be used as a fixed rate blender discharging into storage, for shipment by trucks, barges, or tank cars.

Blends are all made under pressure, there are no blending losses, component proportioning is accurate to within 0.1 percent, and total blend volume is registered. No tankage is required except component storage, and there is a large saving in pumping, switching, and gaging labor. This plant will probably be the forerunner of a new trend in refinery and pipe line operation.



4. Large-capacity meter prover . . .

As larger and larger pipe lines are built, and with the current and expanding practice of multiple-product, multiple-owner lines, the application of positive-displacement meters is necessarily increasing. With this increase in use and in size, there are attendant difficulties in the calibration. Shell Oil Company has developed a technique which employs a "measured mile" of pipe as a large-capacity gaging tank. In order to put this idea on a workable basis, two problems had to be solved. First, the accurate calibration of the line section used, and, of equal importance, the technique of using it after calibration.

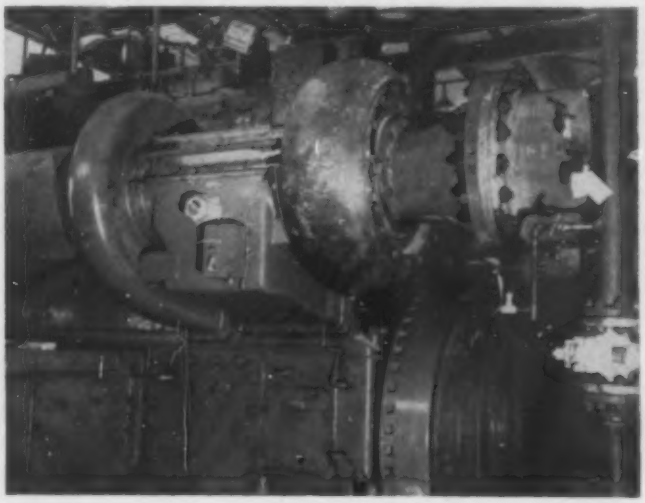
Calibration involved, simply, the measurement of the linefill between two fixed points where trips are installed to register the passage of a scraper, and thus to engage and disengage a counter on the meter itself. Calculation of this volume from pipe dimensions is not sufficiently accurate; the problem was solved by using (at relatively low flow rates) carefully calibrated meters, standard gage tank methods having been used on these.

In operation, the process involves the pumping through the line section of a very "tight" scraper at the selected rate of flow. As it passes the first trip, the meter counter is engaged, and when the second is reached, it is disengaged. Pressure and temperature readings are taken

which permit the correction of data to standard conditions.

Among the advantages of this technique are:

- Little interference with normal line operation.
- Operation is almost fully automatic, so that results are virtually independent of operating technique.
- Operation is safer and less costly because of reduced handling of product.
- Calibration takes place under exact operating conditions.
- The elimination of starting and stopping improves accuracy and lessens maintenance on meters.
- There seems to be no particular limit on flow rates which may be handled by this method.



SUPERCHARGED two-cycle gas engine uses energy of exhaust heat to compress scavenging air.

5. Semi-automatic main line compressor station . . .

GULF INTERSTATE GAS COMPANY has set new highs in over-all thermal efficiencies for gas compressor stations. Careful attention to small details is largely responsible for this achievement. Such matters as the following—turbocharged gas-engines driving the compressors; integrally mounted auxiliaries, so that no power is lost operating excess auxiliaries for an idle engine; streamline design on air intakes and exhausts, lowering friction losses (the turbocharger itself utilizes much of the power normally wasted in a silencer, and discharges directly to atmosphere).

Further contributions to operating efficiency were made by insisting on functional importance for every component incorporated into each station; nothing was used simply because it was customary, but each item had to prove its contribution to efficiency, reliability, or safety.

6. Pulsation dampener . . .

ENGINEERS HAVE developed a pulsation dampener based on accoustical principles analogous to the electrical system known as a "low pass filter." The acoustical elements which comprise the dampener are one volume

PULSATION DAMPENER at compressor plants.

chamber (essentially a short section of large diameter pipe) and two lengths of pipe. As used by Gulf Interstate, the complete unit consists of two such systems in series.

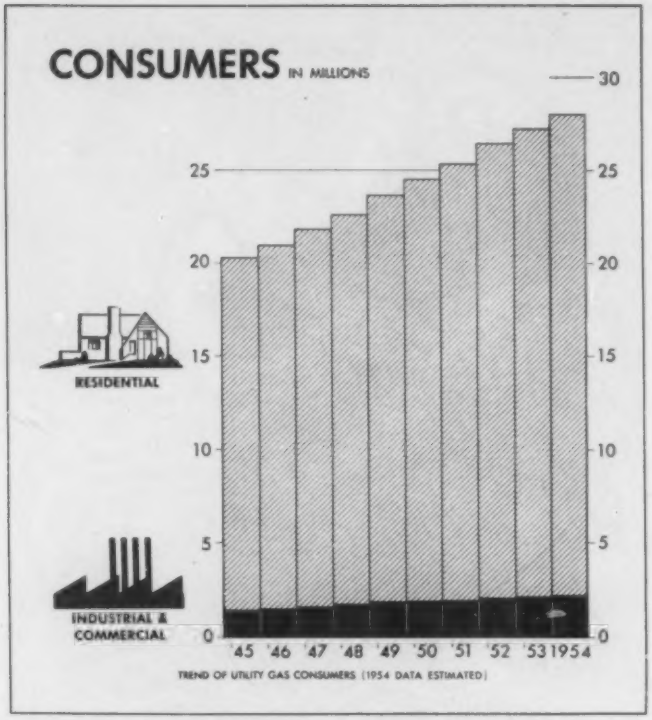
It is characteristic of this assembly that it will pass, with little attenuation, frequencies up to a certain "cut-off" frequency. Then, as the frequency spectrum is extended, there will occur a number of narrow bands which will be passed. All intermediate frequencies will be suppressed to a high degree. Obviously the feat to be accomplished in the design of a dampener is that of selecting dimensions so that none of the pass frequencies coincide with those associated with the compressor involved, either its basic frequency or any of its lower harmonics. It has been demonstrated that this can be done effectively.

Advantages of this type of dampener are chiefly those of very low pressure drop. Values on the order of 0.1 percent have been obtained. It is clear that this represents an important contribution to over-all station efficiency.

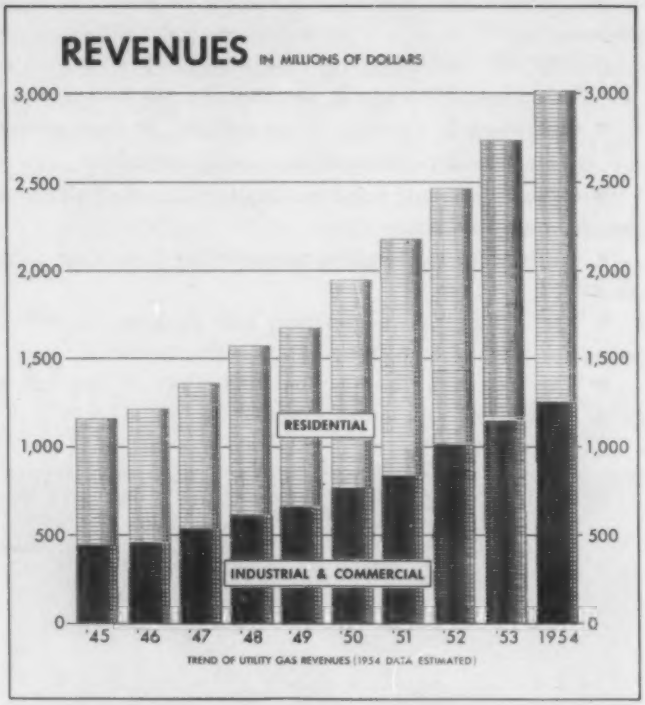
7. Batch detection by capacitance recorder

THE DETECTION of batch cut points, both in crude oil lines and in those handling products, has been sharpened to a high degree by a device reaching acceptance during the past year. It detects small variations in the dielectric constant of the fluid passing between electrodes placed in the line, by the unbalance of a capacitance-resistance

Continued on Page 60



Consumers of Natural and Manufactured Gas.



Total Revenue From Natural and Manufactured Gas.

Gas Industry Looks to Record Highs

Approximately $1 billion to be spent on expansion this year and some $4 billion in four-year period of 1954-1957.

By F. M. BANKS, President, Southern California Gas Company, Los Angeles, and President, American Gas Association

THE GAS UTILITIES AND PIPE LINE COMPANIES in the United States again achieved new record levels in number of customers, in volume of sales and in gross revenues, during 1954. Proved recoverable reserves of natural gas stood at new highs and gross net assets of the gas industry rose to a record $14 billion. All estimates made by the American Gas Association indicate that the major factors which helped lift the industry to record highs in 1954 will continue in effect. There is every reason to believe that the gas industry will go on to establish new records again in 1955.

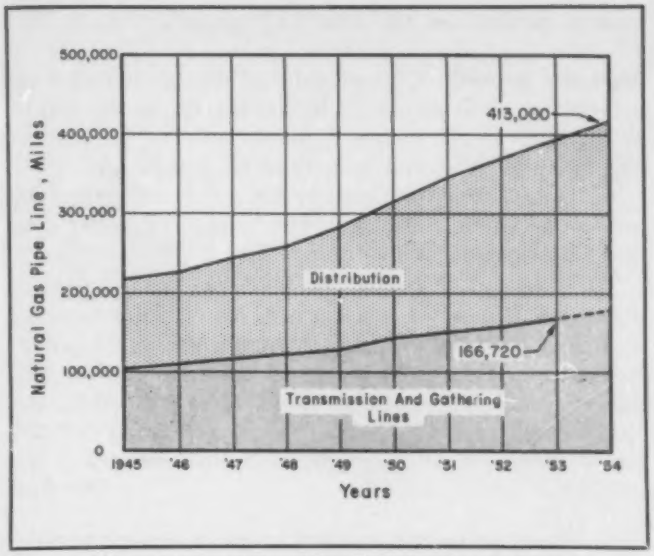
Natural gas systems added nearly 18,000 miles of pipe line (including town distribution systems) to the huge national network, bringing natural gas to some new areas and augmenting supplies in areas already served. Natural gas now supplies about 25 percent of the nation's energy and more than 95 percent of all gas sold by utilities is natural gas.

The utility and pipe line companies spent more than $1 billion in 1954 for new construction and expansion of present plant. **The industry expects to spend almost one billion dollars during 1955 and it is estimated that it will spend $4 billion on new construction and expansion in the four year period, 1954 through 1957.**

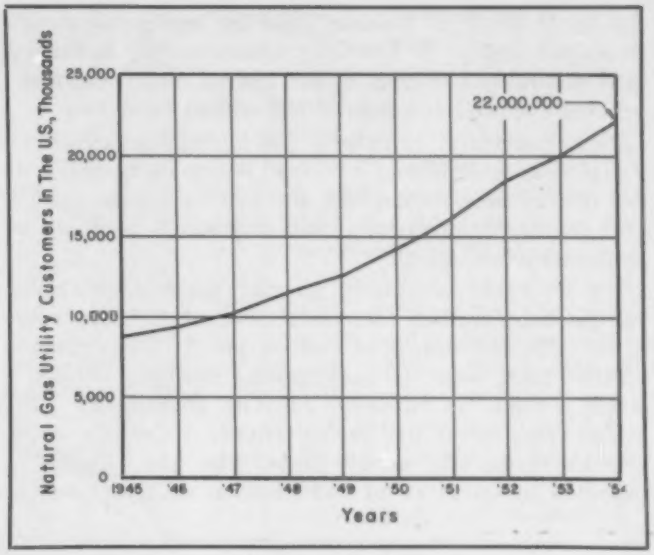
New customers are being added to gas utility mains at a rate of nearly 800,000 a year. This rate is expected to continue for about the next three years. It is estimated that the gas companies will be serving nearly 29 million customers at the end of 1955.

Statistical review and forecast. The gas utilities were serving approximately 28,000,000 customers at the end of 1954, including about 260,000 LPG customers served directly by gas utility companies. This new record high represented a gain of about 750,000 customers or 2.8 percent over the 27,250,000 customers served a year earlier. In addition, about 7,000,000 customers use LPG in areas not reached by gas utility mains.

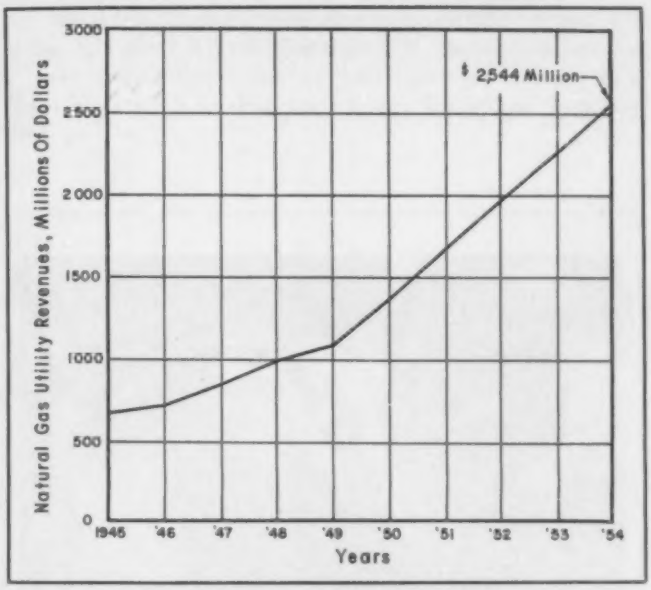
More than 22,000,000 customers were served with natural gas at the end of 1954, a new record and a gain of 5.2 percent over 1953. Manufactured and mixed gas customers dropped about 5 percent under 1953 to total 5,770,000 at the end of 1954.



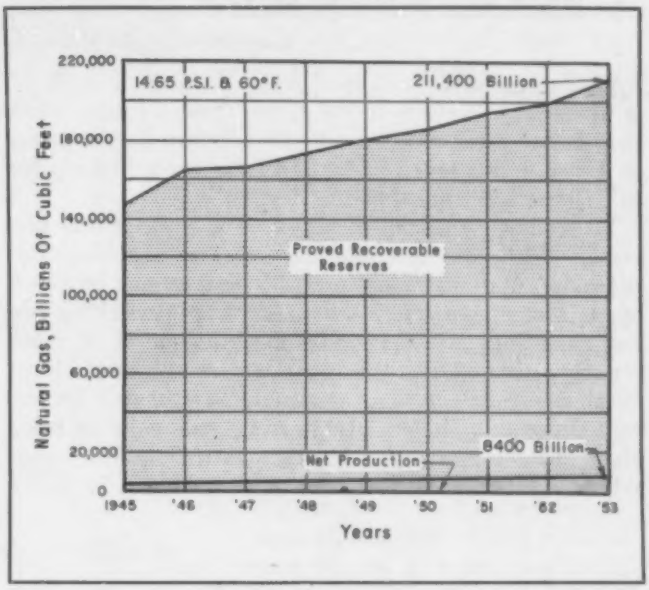
Miles of Natural Gas Piping Excluding Service Lines.



Customer Growth.



Annual Revenue From Natural Gas Sales.



Natural Gas Reserves.

Sales of gas in 1954 aggregated 60,750,000,000 therms, also a new record. This represented a gain of 7.6 percent over total sales in 1953. Natural gas sales reached a new high at 57.5 billion therms, up 8 percent over 1953. Manufactured and mixed gas sales totaled 3.22 billion therms, up about 1 percent over the previous year.

Revenues from the sale of gas passed the $3 billion mark for a new record. The 1954 total of $3,013,000,000 was a gain of 10.8 percent over 1953. Natural gas revenues increased 13 percent to total $2,544,000,000, or about 84 percent of total gas revenues. Manufactured and mixed gas revenues gained slightly over last year to total $448,000,000.

Natural gas systems grow. Natural gas systems added about 17,500 miles of gathering, storage, transmission and distribution mileage to their lines, bringing the total natural gas pipe line in the U. S. to 413,000 miles. With an additional 50,000 miles of pipe carrying manufactured and mixed gas, the nation's system of utility gas mains and pipe line totals 463,000 miles, enough to circle the globe 18 times.

Temporary certification has been granted by the Federal Power Commission for construction of the American-Louisiana Pipeline Company's 1200-mile line from Texas to Michigan. This 30-inch line will cost about $130,000,000. FPC certification also has been granted to the Pacific Northwest Pipeline Company to build its 1800-mile line from the San Juan basin in Colorado-New Mexico to serve the Pacific Northwest, the only geographical region in this country not served by natural gas today.

Natural gas reserves. Proved recoverable reserves of natural gas at the beginning of 1954 totaled 211.4 trillion cubic feet. This was an increase of 11.7 trillion cubic feet over estimated reserves of 199.7 trillion cubic feet in 1953. This gain was made in spite of record production of 9.2 trillion cubic feet of natural gas during 1953.

These estimates include only proved recoverable reserves. They do not take into consideration the full extent of potential reserves in new areas now being explored, such as the offshore deposits in the Gulf of Mexico off Louisiana and Texas. Nor do they include

the great fields of Canada that are being extensively developed today. **It has been conservatively estimated that natural gas reserves in the United States and Canada may be well in excess of 600 trillion cubic feet.**

New discoveries of natural gas in 1953 added about 7.1 trillion cubic feet of new reserves, as compared with 5.4 trillion cubic feet added through new discoveries a year earlier, emphasizing the important increase in exploration activities.

To serve the constantly growing markets, especially for gas househeating, more and more use is being made of underground storage of natural gas. At the beginning of 1954 there were 167 underground storage fields in 17 states, having an ultimate capacity for storing 1735 billion cubic feet of gas during summer months for withdrawal during the winter peaks. **The gas industry is expected to spend about $144 million on underground storage facilities in the 1954-1957 period.**

Industry growth. Over-all sales of the gas industry are expected to total nearly 75 billion therms by the end of 1957. This would represent an increase of 25 percent over sales in 1954 and a gain of 32 percent over 1953 sales of gas. It is anticipated that gas househeating requirements in 1957 will be about 53 percent higher than space heating requirements in 1953.

To meet these increased demands for service, the gas industry will need 4.6 million tons of steel pipe between now and 1957 year-end. Of this total, about 2.9 million tons will be in the form of 16 inch diameter or over, primarily used for gas transmission lines. An additional 134,000 tons of steel in other forms, and nearly 500,000 tons of cast iron will be required by the industry in the 1954-1957 period. **—The End**

Technical Developments of 1954

Continued from Page 57

bridge. So sensitive can it be made that, when crude oil is involved, variations in the crude from a single source may be too great unless sensitivity is reduced. Variations in BS show up very clearly. This has been, in fact, one important application of the device.

Since it is electrical in nature, it is obvious that it is readily applicable to remote indication or signalling; furthermore, it seems highly probable that it may be developed into a completely automatic batch-switching system, and may make possible the elimination of much refinery tankage. At the other end of the crude lines, its ability to detect (and ultimately to measure) BS and water might combine with metering equipment to bring about the elimination of lease tank batteries and the considerable labor costs associated with field gaging.

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8. Shipping natural gas by barge . . .

BY SHIPPING liquefied gas in barges along coastal or river routes, one developer plans to deliver gas, now either unused or waste at many oil fields, to new markets and possibly, in the future, to areas inaccessible by pipe line.

Gas is liquefied under pressure aboard special barges to a temperature of less than minus 250° F., and is heated at the delivery point for regasification.

The first of the developer's eight special barges is now under construction. All barges will have five vertical tanks each 50 feet in diameter and 22 feet high, lined with foot-thick balsa wood insulation. With all eight vessels in operation, the barge system is said to be capable of delivering 18 million cubic feet of gas a day. Barges are expected to operate on a delivery cycle of from 11 to 14 days on a New Orleans-Chicago route.

A comparatively small amount of each shipment of liquefied gas will be vaporized en route for use as fuel, and sufficient amounts will be left in the tanks to provide fuel for the return trip.

One of the difficulties of designing such a barge was the matter of finding metals which would withstand the low temperatures. By insulating the gas from the inside and placing the steel shell on the outside, designers of this type equipment saved thousands of dollars per tank. **—The End**

Good Old Days? Coating and wrapping 25 years ago was strictly a by-hand job—hot and messy. Often the hot tar splashed in a pipeliner's eyes and a quick search was made through the lunch pails for a dab of butter to smear on the burned spot. The 40-to-50-man crew was making good progress if they wrapped 200 feet of pipe an hour as they had to cut off the wrapping material in sections like cigarette paper and wrap each length individually. This scene was photographed in Missouri in 1929.

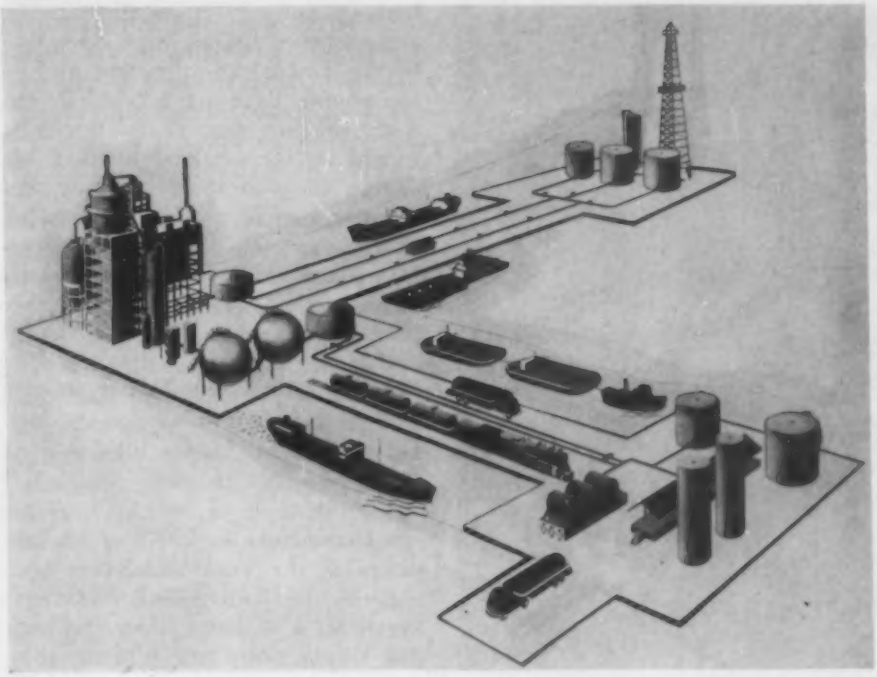

Fig. 1—Transportation flow chart.

Automation Is Coming, API Experts Agree

Here's a look at automatic measuring, sampling and testing equipment used today and preview of the automatic devices yet to come.

Census experts have estimated that in 1975 the population of the United States will be somewhere between 200 million and 220 million.

This represents an additional 12 million to 15 million families.

If we maintain our present standards for living, education and recreation, the demands on the nation's resources and facilities for production, transportation, and commerce certainly will increase considerably.

What effect will these demands have on the petroleum industry? **It is anticipated that about 60 percent more automobiles will be on the road, and some of our own API prognosticators predict that there will be about 65 percent more demand than can be supplied from the present production of about 8 million barrels per day.**

When this estimate of the future is considered, our expanding industry must plan carefully to cope with more and more problems in the storage and transfer of bulk oil quantities.

Present day developments. We can be proud of the contemporary achievements in the field of quantity measurement. We can see the gradual perfection and increasing acceptance of meters as a sound basis for measurement.

The recent introduction of the "measured-mile" system for the calibration of pipe line meters represents another progressive step for improving the measurement of pipe line throughput quantities. Tedious tank climbing and manual methods for the determination of gages and temperatures of storage-tank quantities are being replaced successfully by the use of automatic measuring devices. Some of these devices indicate an interesting trend toward even more simple measurements by remote control, such as batteries of tanks hooked up to central control panels where liquid-level gages and temperature readings can be obtained at will.

These examples of time- and money-saving improvements illustrate the progressive developments which have occurred in the measurement of petroleum and petroleum products. For the long pull, these technological developments must pass the test of "return on investment."

Basic principles. Before any discussion of future possibilities, it might be well to restate the basic principles underlying our appraisal of ideas for future development:

1. Sound measurement always will be the backbone of proper determination of bulk oil losses and the only firm basis for the establishment of good control.
2. The accuracy and other advantages to be achieved and retained must be the optimum as dictated by economics.

A look into the future. With these principles in mind let us take a look at bulk oil measurements of the future. We must, of necessity, exert more imagination and effort in acceleration of our progress.

Visualize what a 65 percent increase in demand represents. It is almost 5 million barrels and would fill more than 20,000 tank cars daily.

To say that this increased volume will require expanded storage facilities is to state the problem mildly. Perhaps the answer is in larger storage tanks. Perhaps storage plans for the future will include the use of underground facilities such as pits and abandoned quarries which have received much study in recent months.

To appear even more radical is to consider how we could aim our efforts toward further automation. Perhaps

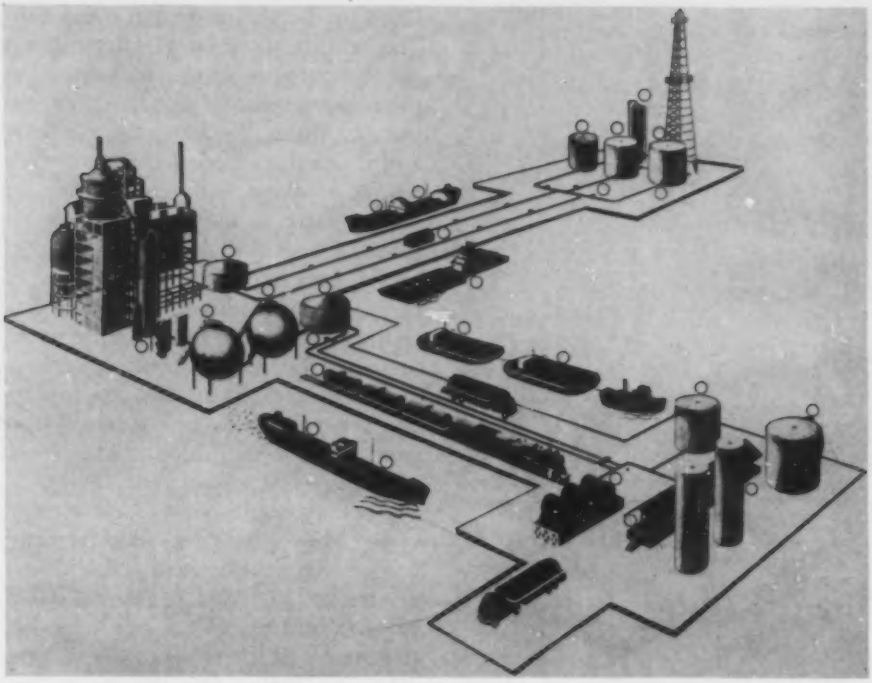

Fig. 2—Locations on transportation flow chart (Figure 1) where men are required.

we should look forward to a nonstop closed system in which the oil moves as a continuous stream from the wells to the refineries as crude oil, and then directly to the point of sale as a refined product.

Because dry gas can be piped directly to the consumer, can we look forward to the day when our customers draw their requirements from metered lines at will?

To stir the imagination a bit more, let us consider the possibilities attached to the fact that a presently available remote-control system may be actuated by electronic impulses.

You have seen the astonishing versatility of electronics in making factory operations largely automatic, and you know of the developments in electronics for simplification of our office clerical work. Many types of measurements are now being made by electronic equipment. **There is no apparent reason why the entire measurement operation in both crude oil and refined products cannot be made wholly automatic.** This includes the determination of net quantities, the calculation of loss data, the computation of crude oil and gas royalties, the recording of inventory control statistics, the compilation of yield information, and the other important end uses of the actual measurement.

The results of such a development would be the immediate preparation and availability of financial statements and other operating statistical reports which are so important to intelligent management.

Another provocative thought involves the basic volumetric units of measure. Are gallons or barrels the best we can use? After all, bananas, among other things, were once sold by the dozen; now they are sold by the pound. Eggs are retailed by the dozen, but are graded and priced by weight for the wholesale market. We cannot say that there is a potential improvement over the gallon or barrel measure for oil, but we should certainly not close our minds to any ideas, regardless of how radical they may seem.

What is being done? After the possibilities have been reviewed the logical question is: "What is being done about them?"

• **Committee work.** All of you are aware of the work which has been done by the Joint ASME-API Committee for Volumeter Research (positive displacement meter code committee). Then there is the work of the American Society for Testing Materials, and of many committees and divisions of the API, leading toward the development and eventual industry acceptance of automatic devices.

• **Automatic gages.** Various types of automatic or ground-level gages which can be equipped for remote reading already have received wide industry

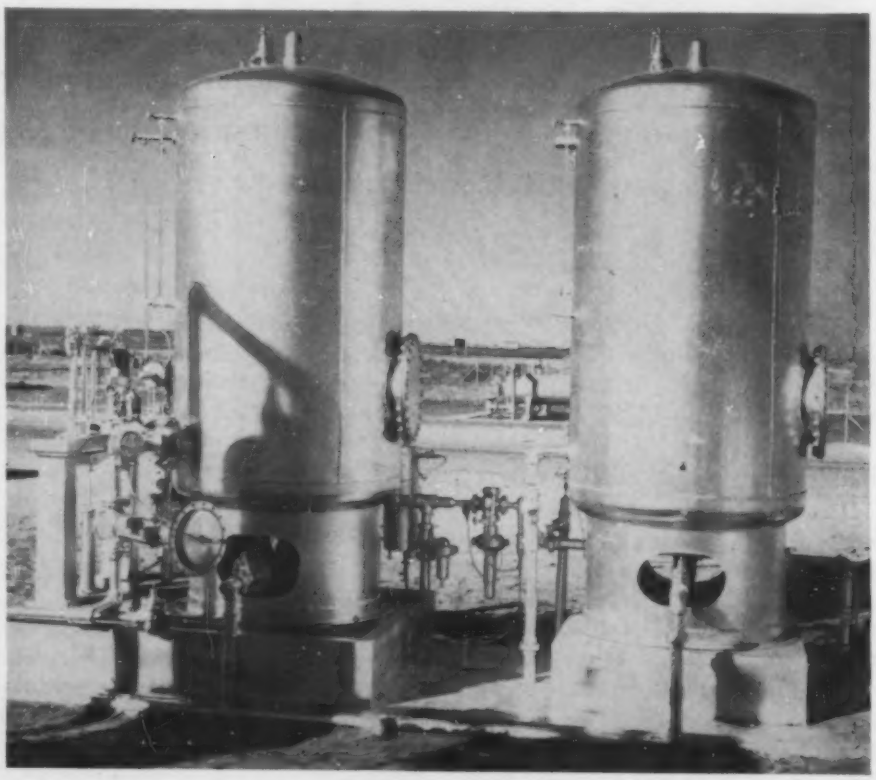

Fig. 3—Crude oil weigh tank.

acceptance and may soon be used generally for measurements for custody transfer. Equipment for the automatic measurement and recording of temperature is also available and may soon be used in custody transfer.

• **Large positive displacement meters.** Other means for measurement of quantities may be in the early stages of development, but they are no less promising. Work has progressed rapidly in the development of large size positive displacement meters, and practical applications have been made. These have obvious advantages and, with automatic temperature compensation, possibly will eliminate the need for thermal correction of volumes.

• **Printed tickets.** The printed-ticket methods now used for meters may find use in gaging techniques. The remote gaging and temperature-measuring devices may be adapted to print or punch inventory data. Furthermore, the punch card may be useful as an order card, an automatic loading or delivery card, as well as an accounting card, all in one.

• **Beam balance weighing.** Equipment for measurement by counting equal increments of weight is under development to utilize the inherent accuracy of the beam balance. This method eliminates the error which may occur in the determination of temperature and the conversion of volumes to 60° F.

• **Calibrated vessels.** One of the simpler and more conventional means of automatic measurement of quantity for automatic transfer is the counting of runs from a calibrated vessel with fixed "sensing" points for upper and lower levels. This arrangement could be thought of as a very large (for accuracy) positive displacement meter.

• **Quality measurement.** Quality measurement and testing can be improved also either through reliable automatic sampling for subsequent testing for "suspended water and sediment" and gravity or through the use of instruments for determining these properties directly in a pipe line or tank.

• **Sampling.** Many improved samplers are appearing on the market, and much is being done to evaluate and improve the sampling methods. These

Fig. 4—Control console of modern pipe line station.

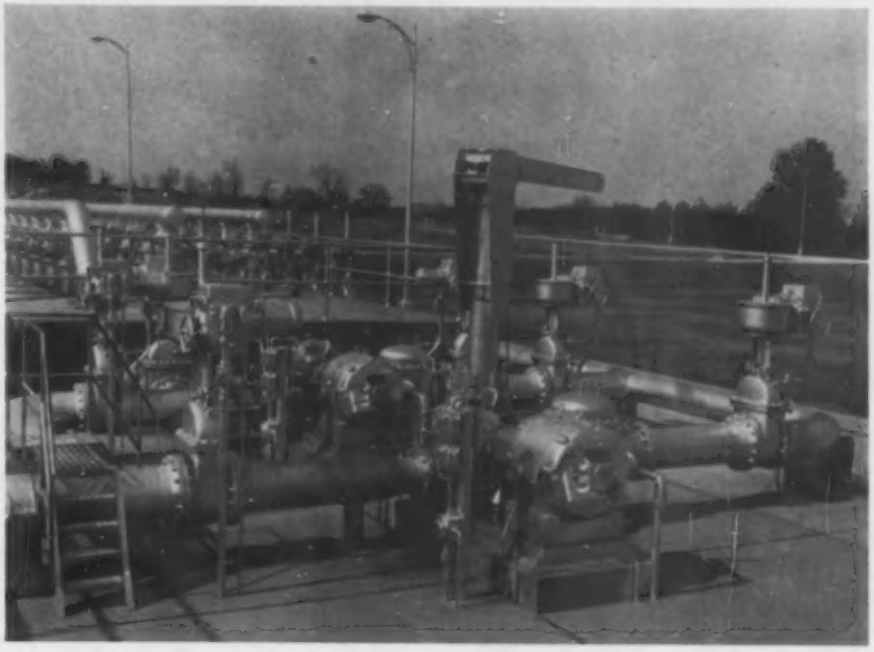

Fig. 5—Pipe line manifold.

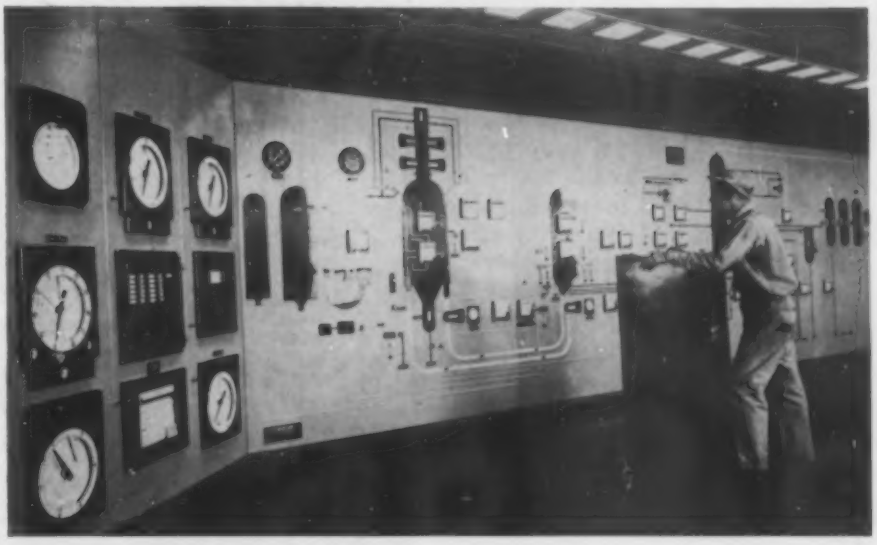

Fig. 6—Modern automatic catalytic cracking plant control room.

Fig. 7—Truck loading rack (top) and control room of modern marketing terminal.

improvements involve the location and type of drawoff tube; the integration of sample volume and stream rate; and the methods for handling, storing and testing the sample.

• **Measuring gravity without sampling.** The measurement of gravity without sampling may be done with several instruments which either are available or are under development. These instruments measure density by determining such physical data as force on a displacement element, weight of a unit volume, pressure of a hydrostatic column, and absorption or rays from a radioactive source.

The measurement of water and sediment content without sampling is more difficult, but significant headway is being made in the development of a method based on the measurement of dielectric constant.

• **Spectrometric analysis.** Inasmuch as control of quality "losses" is being studied to a great extent today, it should be noted that dramatic progress is being made in the development of spectrometric and other analytical instruments which can provide complete qualitative analysis of a hydrocarbon stream

In all cases the possibilities are promising for substantial improvement in the accuracy as well as in the ease and facility of determinations. Most important of all is that progress is being made to make each of these determinations completely automatic.

Centrally controlled transfers? When reliable automatic measurements become a reality, the way will be open for automatic and centrally controlled transfer. Work is now in progress to develop an acceptable automatic-control system for the measurement and flow of crude oil quantities from lease tank batteries. Although only small volumes are involved in this application, there are a large number of such batteries, and the results of this work should be applicable, in general, to other industry operation.

Let us consider the practicability of a composite application of these future developments. Certainly improvements in accuracy can be anticipated because of better control. Increased efficiency and manpower savings should result from the simplicity of operation.

• **Improved safety.** As these devices find wider use, we can also look forward to the continued improvement in the industry's safety record.

If the need for intermediate storage is reduced, some of the present storage problems such as evaporation losses, accumulated sediment, water, flexible bottoms, and the like maye be eliminated or at least reduced in importance. In addition, there are the capital savings which also are to be accomplished.

• **Electronic controls integrated with calculators.** Consider the advan-

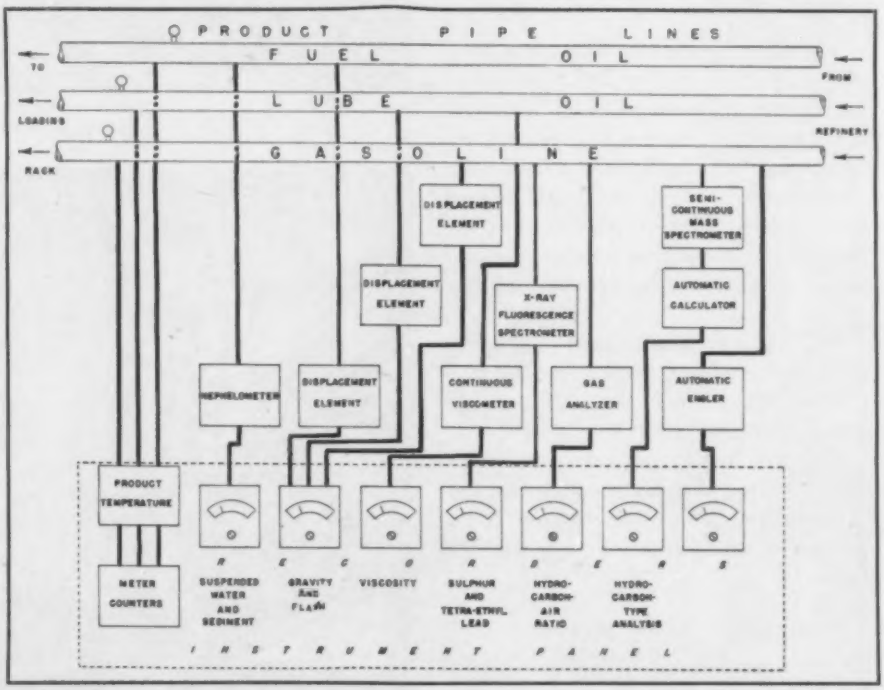

Fig. 8—Flow chart showing battery of instruments for automatic testing of product quality.

tages of a system which has been integrated with an electronic calculator so that measurement can be determined directly on a net-quantity or temperature-corrected basis. The necessity for separate operations to determine liquid level, temperature, and even gravity and water and sediment may be replaced by a simple push-button operation. Plant inventories may become a one-man one-day job. Other developments, such as automatic pumps and valves, may permit product transfer and control in a bulk terminal to be done by a single operator.

Conclusion

- The automatic plan is more efficient and practical. In some cases meters can be installed on pipe lines direct from the refinery, thereby reducing the number of tanks required for terminal storage.
- The plant is safer, cleaner and requires a smaller land parcel, which should be a definite advantage from a real estate and tax point of view.
- Our predictions are not too far in the future, and time should not be wasted if these goals are to be reached. The problems are common to the petroleum industry and can best be solved by a pooling of knowledge.
- We also must explore the information and know-how which is available from sources outside the industry, such as chemical companies, instrument manufacturers, and certain government agencies. In this way the necessary developments can be accomplished without wasteful duplication of effort.
- The time is now. Let us keep rolling toward a bigger and better petroleum industry.

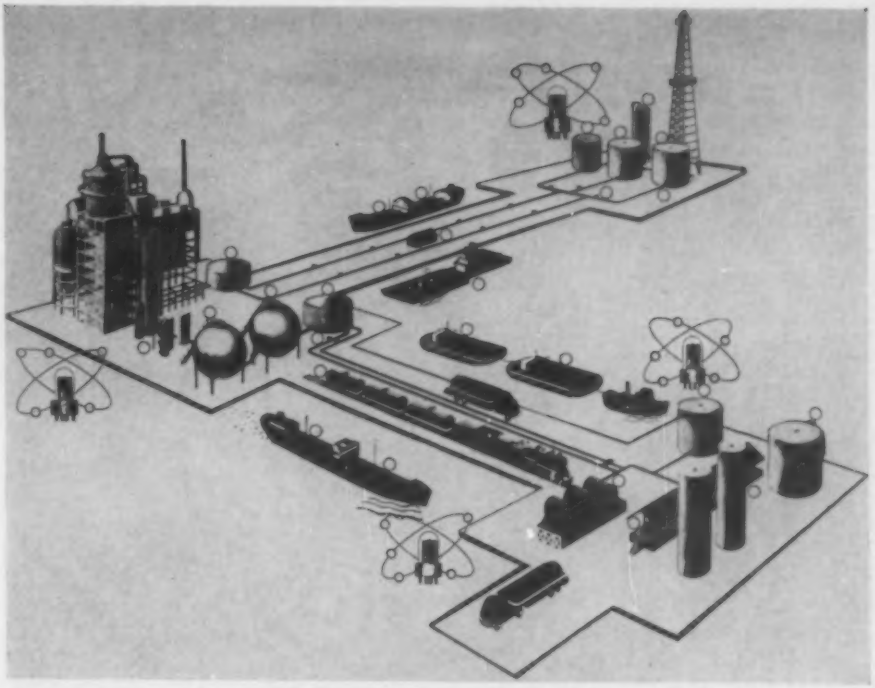

Fig. 9—Locations on Figure 2 showing "electronic" symbols where men have been replaced.

ACKNOWLEDGMENT

Accepting the recommendation of the Advisetory Group of API Code 25 Committee, API President Frank M. Porter appointed, within the Institute's Department of Technical Services, a Program Committee for a Symposium on Measuring Sampling and Testing Crude Oil and Petroleum Products—of which H. C. Packard, Shell Oil Company, New York, N. Y., is chairman; A. H. Newberg, Service Pipe Line Company, Tulsa, vice chairman; and E. O. Mattocks, API New York City, secretary.

Members who prepared the paper, entitled "A Glance into Bulk Oil Measurement of the Future" are J. H. McClintock, chairman, Esso Standard Oil Company, New York; A. E. Miller, vice chairman, Sinclair Refining Company, New York; J. H. Berglund, secretary, Standard Oil Development Company, Linden, N. J.; A. A. Buzzi, Shell Oil Company, New York; E. L. Hoffman, Socony-Vacuum Oil Company, Inc., New York; L. L. Kennedy, Esso Standard Oil Company, Elizabeth, N. J.; R. A. Martin, The Standard Oil Company (Ohio), Cleveland; H. L. Shatto, Shell Oil Company, New York and L. S. Wrightsman, Humble Pipe Line Company, Houston.

—The End

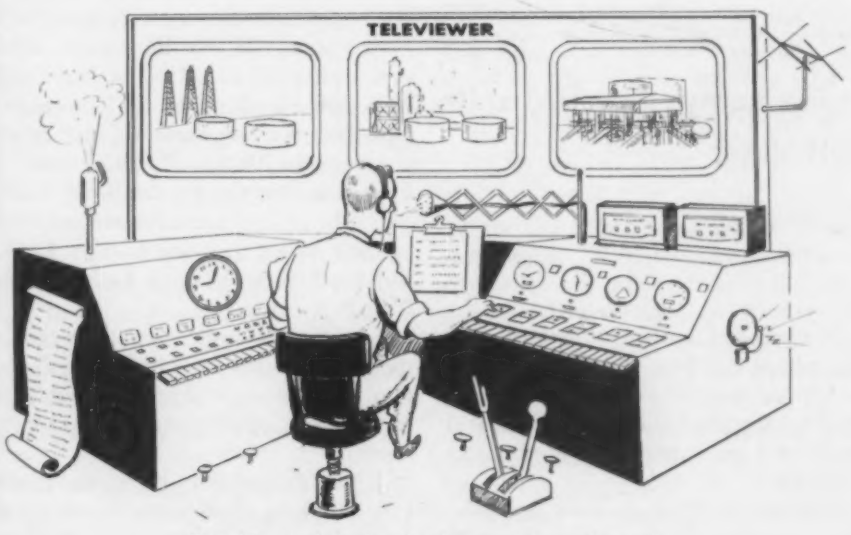

Fig. 10—Artist's sketch of central control panel.

Wanted! . . . an engineer who likes to write

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BOGGED IN A SINKHOLE, a tractor fights to free itself. Despite mud and rock Service Pipe Line Company's new line from Fort Laramie, Wyo., to Freeman, Mo., (625 miles) was laid in record time.

New Record Set for Laying Large-Diameter Pipe Line

Service Pipe Line Company lays 625-mile Wyoming-Missouri line in just 61 days.

By CARL I. HUSS

SERVICE PIPE LINE COMPANY set an all-time world's record for laying large-diameter pipe when the final weld on its 625-mile Wyoming-Missouri line was completed November 15. This was just 61 days after right-of-way clearance started September 16.

The record average of better than 10 miles a day beat the time required to lay comparable sections of the war-speeded Big Inch, Little Big Inch, and other postwar large-diameter pipe line projects.

Starting at Service's Fort Laramie, Wyo., pump station, the line cuts across southwestern Nebraska and northeastern Colorado about 130 miles to Sterling and is 20 inches in diameter. From Sterling to Natoma, Kansas, some 245 miles, the line is 22-inch, and from Natoma to Freeman, Missouri, another 250 miles, it is 24-inch.

Along this route the line passes under 49 highways, countless roads, 21 railroads and eight major rivers, and spans numerous irrigation ditches.

Add to this the fact that 2000 landowners in most of the 48 states, Alaska, Germany, England and Egypt as well as 1000 tenants had to be contacted for right-of-way clearance. And also add that pipe orders had to be placed with five different mills in five different states and the record-breaking performance becomes more incredible.

Significant Dates. To give you an idea of the timing here are some significant dates:

Decision to build the line was made August 12, and orders for pipe were placed on that day. The first right-of-way option was taken on August 18, six days after the decision to build the line was made. (Never was construction held up for lack of right-of-way.)

The first pipe was shipped from the mill August 20. The 67 unloading sites at strategic spots along the line had been selected by that time. The first survey crew was in the field August 24, and contracts for construction of the line were awarded August 25.

Service divided the project into two parts, establishing company headquarters for the western section at Sterling, Colorado, and the eastern section at Abilene, Kansas.

H. C. Jones, Topeka, manager of the company's Nebraska division, was in charge of construction on the western section. H. G. Mariner, Raytown, Missouri, manager of the company's Missouri division, was in charge of construction on the eastern section.

The eastern section was divided into two jobs of two spreads each, or four spreads in all, and was laid by O. R. Burden Construction Corporation, Tulsa.

Like the eastern section, the western section was divided into two jobs of two spreads each and was laid by H. B. Zachry Company, San Antonio, Texas.

J. L. Cox and Son, Raytown; Parkhill Trucking Company, Tulsa, and John Bunning Transfer Company,

Rock Springs, Wyo., strung the pipe. Aero Exploration Company, Tulsa, shot the aerial maps.

Friendly Rivalry. Company specifications required the contractors to furnish two spreads for each of the four jobs. The two spreads were required to work toward each other and continue working until they met, that, is, until construction in the two-spread job was complete.

This arrangement created a friendly rivalry between the company supervisors of the east and west sections, between the contractors on the two sections and between the spreads within the section. And no doubt contributed to the record pace.

The friendly rivalry spurred the eight spreads into welding 108.6 miles of pipe during the week of October 14 through 21, an average of 15.5 miles a day. The record day in this period was 17.4 miles. During the same week one spread welded 3.64 miles (19,200 feet) of 24-inch in one 10-hour day and 23 miles for the entire week.

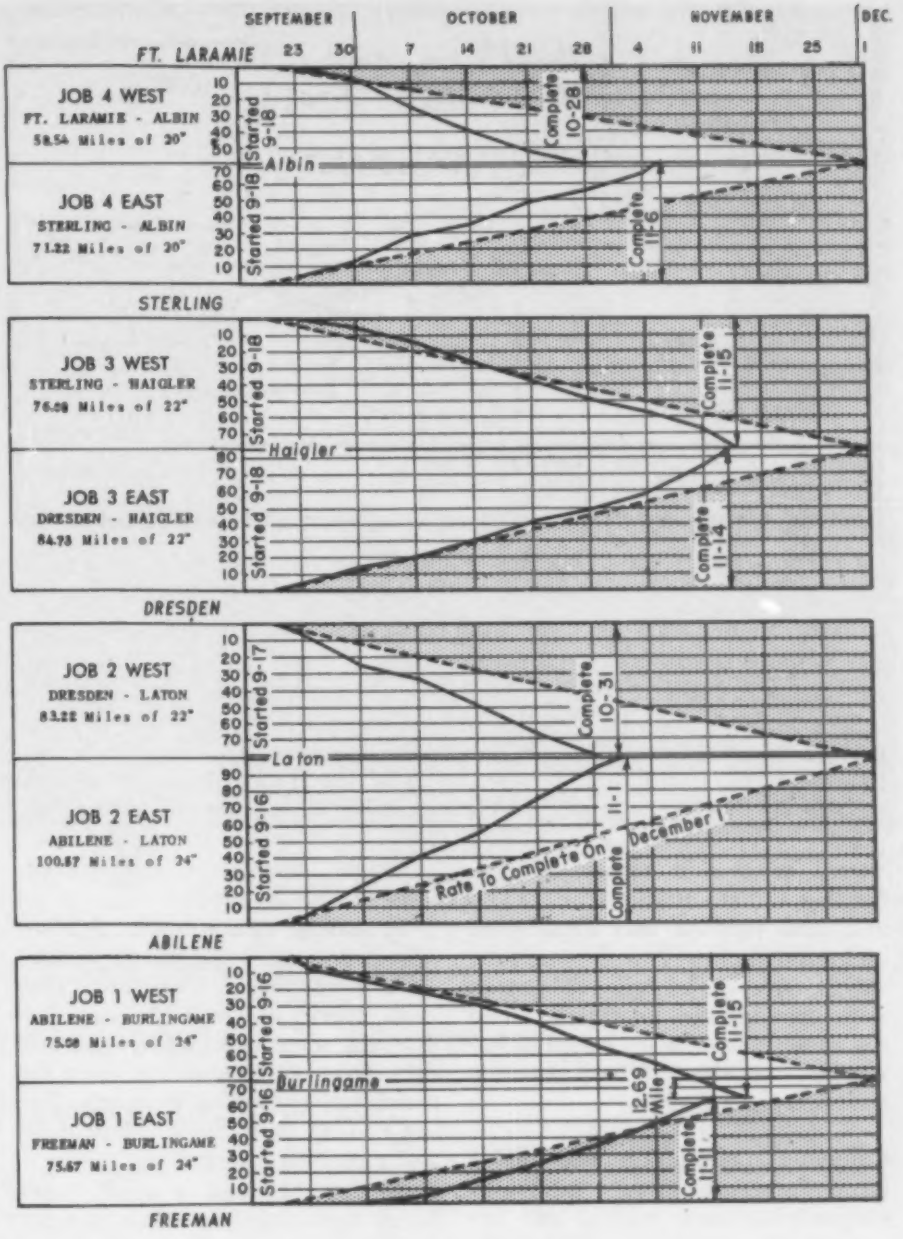
Timing and coordination also contributed to the record. Daily progress reports on all jobs were consolidated in the field offices and phoned into Tulsa each morning. They were recorded mechanically and later transcribed by stenographers. Progress was plotted on special charts in Tulsa. In some instances where a spread had been delayed because of bad weather or other adverse conditions, men and equipment were sent to its assistance from another spread that had completed its work.

Another example of the timing concerns the delivery of pipe. More than 4400 railroad cars hauled the pipe from five mills at Milwaukee and Houston (A. O. Smith Corporation); Gadsden, Ala. (Republic Steel Corporation); McKeesport, Penn., and Lorain, Ohio (National Tube).

API Grade 5 LX-52 pipe was used for all spreads.

Pipe was only one item. Valves, coating, casing and other materials had to be, and were, delivered at the right spot at the right time. For example, about 4,980 feet of 30-, 26- and 24-inch casing was used for the 49 highway and 21 railroad crossings.

River Crossings. Separate crews in addition to the eight line-construction spreads laid major river crossings



PROGRESS OF THE EIGHT SPREADS on the new line was plotted on charts like this. Daily progress reports on all jobs were consolidated in the field offices and phoned into Tulsa each morning. They were recorded mechanically and later transcribed by stenographers. In some instances where a spread had been delayed because of bad weather or other adverse conditions, men and equipment were sent to its assistance from another spread that had completed its work. Dashed lines denote proposed schedules. Solid lines denote actual progress.

across the North and South Platte, Republican, Solomon, South fork of the Solomon, Smoky Hill and Grand (twice) rivers. Some 8500 feet of half-inch river pipe coated with Rosson-Richards Wate-Kote containing barytes was used.

River crossings were ditched with a minimum of four feet of cover below the stream bed.

Normally, covering on land was 20 inches, but in the contour-plowed country of Wyoming and Colorado 36 to 54 inches of covering was required. To avoid future trouble, county and conservation agents were consulted about land that might be deep plowed later. Pipe was laid extra deep across those spots, too.

Since the growing season was about over, most farmers were through irrigating for the year, which made it easier to construct the line across the irrigation ditches. Depending upon

GENERAL ROUTE of Service Pipe Line Company's 625-mile large-diameter line.

the wishes of the irrigation authorities, the line was either buried below the ditches or spanned them.

The longest span across an irrigation ditch was 63 feet of 20-inch near Sterling.

Sand, as well as rock, presented a problem. Worst spot was a 70-mile stretch of sandhill country between Sterling and the Kansas border. This arid land supports only tumbleweed and sparse grass and is swept by strong winds. The stringers' trucks and other vehicles bogged down in the sand. Some caving occurred but usually was whipped by using side slopers on the ditches.

Clean-up Trouble. The real trouble came during the clean up. Winds whipped the sandy backfill and the men could see that it would be only a matter of time until the pipe lay bare again. They tried several methods of stabilizing the backfill before they hit upon the use of straw and alfalfa hay. They spread the straw and hay along the right-of-way then disced it into the sand. This left a stubble sticking up that broke the flow of air currents the same way a wheat stubblefield does.

As further precaution they cross-furrowed the sand and hay mixture, using a notched 20-inch pipe. In addition, they sowed the right-of-way with buffalo grass and other seeds suitable to the farmers.

Despite the speed involved, community relations was not ignored. Before construction started, staff members from Tulsa met with company inspectors and outlined strict practices to be followed. Company representatives met with the contractors for the same purpose.

During construction Jones and Mariner spoke to civic organizations, explaining the fundamentals of construction, the purpose of the new line and what it meant to the local citizens.

Nearby newspapers were encouraged to visit the project.

In making their contacts, right-of-way men handed out two pocket-size booklets profusely illustrated. One dealt specifically with the new line and explained with pictures and text each phase of construction from the aerial survey to final clean up. The other dealt with Service Pipe Line and pipe lines in general.

Another handout, a single cardboard sheet complete with a hole for hanging on a nail, showed pictures of the eight chief inspectors. The card explained to the landowner how to get hold of the men in case he wasn't satisfied with the way he was treated.

Line fill started November 9 at Laton station near Natoma, Kansas, and now is being carried on at Fort Laramie and Sterling as well. About a million and a half barrels of oil will be required to fill the line.

Initial capacity of the line into Freeman is 178,000 barrels a day. The line is designed to handle well over 200,000 barrels a day with additional pump stations.

Fort Laramie eventually will be converted to electrical operation, but for the present is using diesel and gas engines for pumping. Highest point on the line lies 56½ miles out of Fort Laramie and 400 pounds pressure is required to get oil over that high point (5366 feet).

After the line leaves the Fort Laramie range it drops steadily to 836 feet above sea level at Freeman. This rapid drop presents problems in hydraulics when batching at less than full line capacity. To prevent commingling, back pressure is applied by several control valves. They are double-seated diaphragm valves operated with three to 15 pounds of compressed air. If they fail, spring loaded relief valves come into play.

Crude from the Denver-Julesburg basin will enter the line at Sterling station. At present, the station consists of some tankage and a 50-horsepower electric motor driving a horizontal duplex pump. As operations expand the station will be enlarged.

Two 500-horsepower diesel engines driving horizontal duplex reciprocating pumps inject crude oil from Service's west Kansas system into the line at Laton. Two 107,000-barrel tanks are nearing completion and a 130,000 barrel tank will be built later. Laton station, an old diesel installation, eventually will be rebuilt with modern diesel engines on a new site.

Additional tankage will be erected at Freeman station, termination of the new line and the hub of Service's 13,000-mile pipe line system.

Pipe Line Pioneers. Service pioneered pipelining from the Rocky Mountain area in 1923 with a 700-mile 10- and 12-inch line from Wyoming to Freeman. Immediately after World War II there was need for increased capacity out of the Rocky Mountain area to keep pace with new oil discoveries. Despite the serious pipe shortage at the time, Service (then Stanolind) increased the capacity of its line by laying 16-inch to the extent pipe was available, replacing the original 10-inch, and additional capacity was gained by reactivating several pump stations.

The new line replaces the old system. Service's Wyoming system west of Fort Laramie will continue to operate as at present. It serves producing fields in the Wind River, Big Horn and Powder River basins, and refineries in the Rocky Mountain area, as well as connecting to the new line. —**The End**

George L. Chapman, Wolverine attendant at Hammond, Indiana, transmits pipeline operations data to New York over a Bell System teletypewriter circuit

"Bell System furnishes us dependable communications at a price we can't equal"

—says Cyrus S. Gentry, President of the Wolverine Pipe Line Co.

Flexible, low-cost communications is what Wolverine Pipe Line Company is getting by renting private line teletypewriter service from the Bell System.

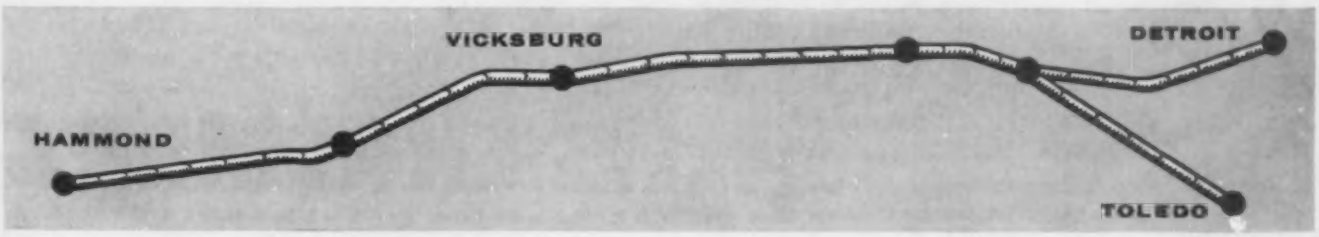
From Hammond, Indiana, products are started along the 295 miles of 16-inch pipe line to Detroit and Toledo. By using a Bell System teletypewriter circuit the operator starts or stops the big high-pressure pump at Vicksburg, 125 miles away.

Hundreds of miles east in New York, a dispatcher keeps round-the-clock watch over the Wolverine Pipe Line's seven stations. He gets reports and sends orders over Bell System teletypewriters.

"The expense of a privately owned system would be far in excess of a rented circuit," says a Wolverine official.

To find out how your communications efficiency could be improved, and costs lowered by using Bell System service, ask your Bell Telephone representative.

BELL TELEPHONE SYSTEM



For more data on advertised products, use Readers' Service Cards, last page.

The Facts Behind Allis-Chalmers Leadership in Torque Converter Tractors

***Fourteen* years of experience . . . *eight* years with production models . . . *thousands* of torque converter tractors out in the field . . . *millions* of operating hours on every kind of work.**

TODAY'S top pipeline contractors have given their "stamp of approval" to torque converter drive — as a key factor in the new standards of tractor performance they need for today's closely-bid jobs. Here's why —

Automatic Matching of speed and pull to load and terrain conditions . . . more dirt moved every hour, day in and day out.

Hydraulically cushioned protection for engine, clutch, transmission, rear end. The entire tractor lasts longer! That means less downtime, lower maintenance costs.

Operators love it! Allis-Chalmers torque converter tractors are so easy to handle (most shifting is eliminated) that operators do a top-notch job all day long.

Yes, pipeline contractors are buying more and more torque converter tractors . . . *and in this, Allis-Chalmers leads the way.*

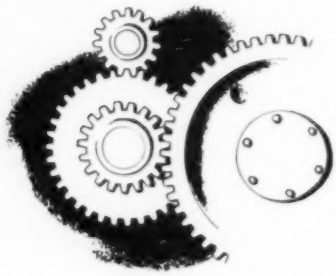
But, remember, you don't buy just one feature . . . you buy a *tractor*, with torque converter drive designed as a matched part of the entire machine. This advanced drive is only *one* of the many outstanding features that have switched so many users to Allis-Chalmers tractors. So . . .

Check all these features before you buy!

All-Steel Box-A Main Frame with one-piece, rear-end housing gives improved weight distribution, soaks up shocks, provides better equipment mounting, greater servicing ease . . . longer equipment life.

Service Simplicity of Unit Construction — Power drive components can be easily removed, repaired or replaced without disturbing adjacent parts . . . saving time and money.

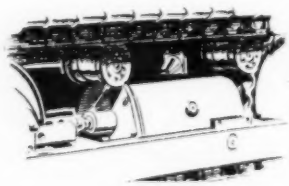
"Live" Sprocket Shafts — "Live" shafts with straddle-mounted bearings permit small, more serviceable seals. Double reduction final drives with smaller gears and shorter, heavier shafts mean extra ground clearance, better alignment, longer life.



1,000-Hour Lubrication — Tapered roller bearings and positive seals on truck wheels, idlers, support rollers and final drives extend lubrication intervals, cut downtime.

Hydraulic Booster Steering — Gives operator small tractor maneuverability with new ease. In addition, self-energizing brakes which take hold with a firm, uniform grip, provide exact control and sure safety with less pedal pressure.

True-Dimension Track provides maximum ground contact . . . plus the right design, the best steels for every job condition . . . heat-treated for long life with the industry's newest, most complete facilities.



Oil-Enclosed Track Release Mechanism — Operates in oil, seals out dirt and moisture, always in working condition to provide positive protection.

See your nearby Allis-Chalmers dealer now for the full story. Whether you're interested in a big tractor like the HD-20 or HD-15 . . . or the smaller HD-9 and HD-5, you can be sure of getting the most advanced tractor in the business, because Allis-Chalmers is the leadership line.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

1940 THE FIRST tractor in the world with torque converter drive.

WORLD WAR II—The torque converter equipped M-4 military tractor, built by Allis-Chalmers.

Picture History of the Torque Converter Tractor

1947 THE HD-19 proved the value of torque converter drive for big production.

1951 THE HD-20, 175 net engine hp, most productive tractor in the business.

1954 THE HD-15C, 135 net engine hp, brings advantages of torque converter to a new range of work.

For more data on advertised products, use Readers' Service Cards, last page.

CROSS OVER THE BRIDGE. This Clark River crossing is nestled in one of the most picturesque valleys in Montana, about 90 miles northwest of Missoula. This is an 820-foot span featuring a rigid frame tripod tower 105 feet high.

540-Mile Yellowstone Pipe Line Completed

New $20 million line from Billings, Mont., to Spokane, Wash., crosses rugged mountain terrain.

THE RECENTLY COMPLETED $20,500,000 Yellowstone pipe line, one of the nation's newest transportation facilities, is the first pipe line to reach Spokane, Wash., and the "Inland Empire" from the Montana slopes of the Rocky Mountains. Because of the rugged mountain terrain and thick pine forest, the line is considered one of the roughest pipe line construction projects to date in the United States.

Continental Pipe Line Company, a subsidiary of Continental Oil Company, supervised the construction of the Yellowstone products line. The newly formed Yellowstone Pipe Line Company is operating the system under direction of Continental Pipe Line Company.

The 540-mile line is jointly owned, 40 percent by Continental Oil Company; 40 percent by Interstate Oil Pipe Line Company; 14 percent by Union Oil Company of California; and six percent by the H. Earl Clack Interests of Spokane and Haver, Mont.

The Yellowstone line required more than 35 river crossings. There were many areas where construction crews had to penetrate almost solid rock. To clear right-of-way, workmen in Northern Idaho had virtually to saw their way through some of the country's tallest virgin pine.

The 10-inch Yellowstone line originates at Billings, Mont., and follows closely the early routes of Indians and the famous American explorers, Lewis and Clark. From Billings to Bozeman, Mont., the line straddles the old Bozeman Trail, a route taken by Lewis and Clark on their return from the Pacific. Then it follows the explorers' western route along the Missouri River to Helena and the historic Clark pony express trail and the Mullan Road into Coeur d'Alene and then Spokane, headquarters for the rich Inland Empire.

Once it climbs the rimrocks near Billings, the start of the Yellowstone line's route at about 3000-foot elevations is relatively smooth, spanning gently sloping Yellowstone Valley ranch and wheat land for 100 miles before it breaks into the Rocky Mountains beyond Livingston. Then the line zig-zags over the 6000-foot Bozeman Pass and curves northward to parallel the Big Belt Range of the Rockies.

West of Helena the pipe line climbs to 6325 feet to its highest point at the top of McDonald Pass, then gradually drops back to 3000 feet before scaling the Bitterroot mountains on the Idaho-Montana border at 5100 feet. From there it follows a downhill

NEW HOME FOR CONOCO PRODUCTS IN SPOKANE. Here's Continental Oil Company's new $1 million Spokane terminal which has a storage capacity of 257,000 barrels of fuel. Yellowstone Pipe Line Company's modern office building is in left center of picture.

course past Coeur d'Alene and on to the Spokane Valley.

The line is constructed of a 10-inch high tensile strength pipe that varies in wall thickness from .344-inch to .250-inch. It was designed with telescoping wall thickness so that a minimum amount of steel would be used in the pipe.

The line was coated with coal tar primer and enamel $^{3}/_{32}$-inch thick. Glass fiber was then pulled into the enamel and a 15-pound asbestos felt outer wrap was used. In rocky areas where dirt covering was not available to pad the line, rock shield was used to protect the coating from heavy rocks in backfill.

X-ray inspection was maintained on the line, with critical areas, river crossings and stations having 100 percent coverage. Test leads were provided for checking cathodic protection, and aerial markers were installed for marking the line's route for aerial patrol flight.

Block valves were installed in the main line at about 25-mile intervals to isolate sections of the line. This will prevent drainage of the line from the high mountain areas in the event of a break.

Because the line parallels an electric railroad for a considerable distance, extensive cathodic protection is necessary. Rectifiers are being used along with other current directing devices.

There were nine major river crossings involved in the construction of the Yellowstone line, of which two—the Missouri and the Spokane River crossings—were made under water. The other seven were overhead crossings of a new design. This design featured a rigid frame tripod tower which expedited the erection of the crossing. In addition, there were more than 25 minor river crossings.

Two stations were constructed—the initial station at Billings and an intermediate station at Helena, Montana—which give the line a capacity of approximately 30,000 barrels per day. The Billings station alone will pump approximately 19,000 barrels per day. Future plans call for a maximum of five stations and an ultimate capacity of 50,000 barrels per day. Station discharge pressure is 1700 psi. All fittings are 900# ASA.

Products move into pipe line at Billings from Continental Oil Company and Carter Oil Company refineries. The products are delivered to the station through eight-inch transfer lines by booster substations at the two refineries. These booster substations are operated remotely from the Billings station control room through supervisory controls. Switching of the manifold at the refineries to deliver the various products into the transfer line also is accomplished remotely from the station control room.

The two transfer lines lead to a manifold at the main station. Switching between the two lines is provided by motor-operated valves controlled by the station console.

Pump units at the Billings station consist of electric motors with centrifugal pumps. Three 500 horsepower and one 200 hp electric motors are being used, with four pumps—two 6-stage and two 4-stage. The pumps are equipped with different size impellers to obtain a maximum number of combinations of units to reduce throttling when the various products are being pumped.

The units are placed on the line by a starting sequence initiated by the control console in the main pump station. This control sequence allows the equipment to be placed on the line in the safest and most efficient manner, and facilitates operation of the station by a minimum of attendance.

All products moving into the line are filtered through self-cleaning jet type strainers, which are equipped with 200-mesh screen. An automatic sequence to accomplish this cleaning has been provided, which helps keep the operating force at a minimum.

All products delivered to the line are metered at the station and the combined products reading is delivered to a dual printer-head in the

PIPELINER'S NIGHTMARE. At the left is what the right-of-way looked like on the Yellowstone line when pipeliners first entered Coeur d'Alene National forest in Idaho to clear the way for construction crews. Continental Pipe Line Company purchased the trees it cut from the U. S. government and sold them to lumber mills. Rates were set by the U. S. forestry service. At the right is an outstanding example of sidehill construction along Yellowstone route. That's U. S. Highway 10 rounding the bend. This was a popular vantage point for "sidewalk engineers" and the roadside often was jammed with cars stopping to watch construction crews build the first pipe line over the Rockies from Montana.

control room. Switching of the meters is accomplished through the use of a capacitance cut point instrument.

All instrumentation of the station is electronic, and all indicating and recording information is transmitted electrically. Equipment has been used which provides the following controls and records:

- Suction and discharge pressure controller regulates the station throttle valve, with a kilowatt demand controller provided for overriding control to maintain a low demand on start-ups.
- A temperature recorder is used to maintain an accurate record of the temperature of products entering the line.
- A flow recorder maintains a continuous record of the rate of the stream.
- A capacitance recorder also is being used to facilitate making switches between batches in the manifold of the two transfer lines.
- Pressures are measured by SR4 strain gage pressure cells and will be electrically transmitted to gages on the control console.

The pump building is a brick veneer masonry block construction. A positive pressure is maintained on the control room side while a slight vacuum is held on the pump room side, thus insuring against product vapors entering the control room.

Pipe line delivery points are located at Bozeman, Helena and Missoula, Mont., and Spokane, Wash. These delivery facilities are designed to remove products from the line through either a "heart cut" or by taking the entire line stream into the delivery point. Throttle valves are provided with flow controllers to maintain a packed line at all times. The self-cleaning strainers and meters with combinated readings are also used at the delivery facilities. Separate headers for oils and gasolines will be provided to assure a separation of products and to eliminate contamination.

Because of the large differences in profile elevations along the line, it is necessary to provide a means of controlling the pressure at Spokane to maintain a packed line. The static pressure at Spokane when the line is shut down will vary between 1300 and 1500 pounds per square inch, depending on the product in the line.

To start the column moving in the line and still maintain a high throttle pressure at Spokane, it was necessary to provide two back-pressure valves. One valve is capable of throttling out the extremely high start-up pressures; the other maintains a back pressure during normal operation, which will be approximately 500 to 600 psi. These two valves are arranged in parallel so that control of flow may be changed from one valve to the other.

The Yellowstone line will be delivering products to six distribution terminals, two of which are owned by Continental Oil Company and located at Helena and Spokane. The other four are owned by The Carter Oil Company and are located at Bozeman, Helena, Missoula, and Spokane. These terminals provide 890,000 barrels of storage into which Yellowstone delivers products for local distribution. Major products being distributed from the terminals are regular and premium gasoline, No. 1 fuel oil and diesel fuel.

Each terminal has a truck loading rack, which delivers products by meter to tank trucks for road distribution, and tank car loading racks for shipment of products by rail to the surrounding area. Warehouse and storage facilities also are provided.

Main offices of the Yellowstone Pipe Line Company are located at Spokane. Operation of the pipe line is controlled through a leased telephone circuit from the company's Spokane offices.

With the inauguration of its 540-mile line from Billings to Spokane, the Yellowstone Pipe Line Company gives added impetus to the economic progress and development of western Montana and the Inland Empire.

—The End

LUBRICATE PLUG VALVES

in seconds — instead of minutes

with this timesaving combination

Yes, seconds are all it takes to lubricate plug valves, today. You'll eliminate waste, and save time and effort with this combination: Walworth High Pressure Lubricant Gun, Walworth Button-Head Fittings, and Walworth Jumbo Size Lubricant Sticks. They'll pay for themselves quickly and are adaptable to most of the lubricated plug valves that are in use today.

Walworth High Pressure Lubricant Gun. This is the only gun available today that satisfactorily handles the stick form, full-bodied lubricants needed for proper lubrication and sealing of plug valves. Easy to operate; two Jumbo Size Lubricant Sticks fill the barrel.

Walworth Button-Head Lubricant Fittings. Use them as lubricant fittings or as regular lubricant screws with standard size lubricant sticks. Just slip hose coupling onto fitting for a leakproof connection.

Walworth Jumbo Size Lubricant Sticks. Individually wrapped and packed ten to the box; clean and easy to handle . . . eliminate messy loading. Types available for most line fluids. Always use Walworth Lubricants in Walworth Lubricated Plug Valves.

Start saving today . . . call your nearby Walworth Distributor. He'll be glad to supply Walworth High Pressure Lubricant Guns, Button-Head Fittings, and the right Jumbo Size Lubricant Sticks for any lubricated plug valve service condition.

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

CLEANING, COATING, WRAPPING & RECONDITIONING

★

HOT DOPE

Straight from the Kettle on *PIPE PROTECTION*

★

By Boyd Mayes

Most times I agree that the shoemaker should stick to his last and pipe liners to pipe—but, since everybody is having his say on the FPC, gas transmission problems and price at the wellhead—feel it's fair to the public to remind 'em that all those words both pro and con which could confuse are covering up something *much more important than price issue*. As we see it—IT'S A MATTER OF PRINCIPLE or basic rights in business. We always figured that when a man got out of line—the law should get after him. But if he's a good member of the citizenry and disciplines himself—we never felt the law should lecture him. Seems to us somebody in the government was anticipating trouble—not waiting for any evidence of it. And we don't know of anything that regulates price better than competition between buyers and producers. Reckon that's somewhat the opinion of a lot of folks on this new problem.

But now back to my pipe yard—we're happy to offer to those who need it, the finest in men, equipment and know-how in your pipe salvaging, coating and wrapping problems.

MAYES BROS.

1150 McCarty **HOUSTON, TEXAS** ORchard 7566

Chances of Amending Gas Act Are Good

But victory—if it comes—will only be after epochal fight. Balance of power in Upper House rests with 41 uncommitted Senators. Outlook in House is vague at the best.

CHANCES ARE GOOD that the new, Democratic-controlled Congress will overturn or modify the Supreme Court's edict that the Federal Power Commission must regulate the price of natural gas from the wellhead.

But victory will come only after an epochal fight.

On the basis of past record, at least 29 holdover or re-elected Senators will vote—with President Eisenhower's tacit backing—to outlaw the decree. In March, 1950, this bi-partisan bloc supported the bill by Sen. Robert S. Kerr (D-Okla.), later vetoed by President Truman, which would have exempted independent producers from federal regulation.

This same bloc heads into the new Congress determined to salvage state control and confident they will achieve some success. Their strategy is being charted warily by sound heads who currently are considering a "one-shot" approach. Under this plan they will withhold any remedial legislation until assured they have enough votes "in pocket" to win.

May compromise. If some form of compromise is necessary, they will accept it. But they hope to restore the status quo—no federal regulation except in interstate commerce—which prevailed before the High Court ruled in the Phillips Petroleum Company case last June.

Opposing this group, also on the basis of the Kerr bill record, will be 26 senators from the Eastern and Midwestern gas-consuming areas. But some of these could defect. A member of the pro-repeal bloc, who wished to remain anonymous, said he had reason to believe some are deeply disturbed by the confusion and chaos caused by the Supreme Court's decision and think the situation should be remedied.

In the final analysis, the balance of power on how the Senate acts will rest with 41 uncommitted senators—holdovers, re-elects, and freshmen—who will be approached early and earnestly by colleagues determined to circumvent the court.

The outlook in the House is vague at best. That chamber passed the Kerr Bill by the scant margin of 176-174. But back in the speaker's saddle will be the same man—Texas' Sam Rayburn—who helped force the Kerr legislation to passage four years ago.

Plans laid. "There certainly will be an effort to pass legislation to improve the present situation," Rayburn told WORLD OIL. He added that he would have no further comment until he had thoroughly digested all developments. But already standing by to introduce a bill is Rep. Oren Harris of Arkansas, second ranking Democrat on the House Commerce Committee which handles such measures. When the Democrats take over the committee will be headed by Rep. J. Percy Priest of Tenn., who is expected to give Harris a sympathetic ear.

Representative Harris said he would predicate his measure on "a survey of what the entire industry wants," plus recommendations made by Eisenhower's National Fuels Resources Committee. Harris also hinted companion bills will be offered by several of his colleagues.

"Now that the Supreme Court has acted," said Harris, "Congress must move to retrieve its legislative responsibility." He said House strategy still must be worked out and decisions reached on "who will carry the ball." He was unable to say where House and Senate plans will parallel but

made clear the House bloc will try to present a solid front.

First major obstacle in the Senate could be Sen. Warren G. Magnuson (D-Wash.) who is expected to head the Commerce Committee. Magnuson was paired against on the vote on the Kerr bill in 1950. But next ranking Democrat on the committee is Sen. Lyndon B. Johnson of Texas, the new Senate majority leader whose esteem Magnuson will not want to alienate.

Johnson is in the thick of plans—along with Sen. Kerr—to by-pass the Court's decision. But he is keeping mum publicly. Soon after the court's ruling, he denounced it as "shockingly wrong," and "flying in the face of well-established precedent." He said it was obvious that Congress would have to act "to halt the march toward government regulation."

Also giving support will be Sen. Kerr. But mark it down now that he will not sponsor a bill, as he did in 1950. At that time, he acted at the unanimous request of the Oklahoma Legislature, a fact lost sight of when opponents branded it the "Kerr Bill" and almost defeated it, with the aid of Fair Deal newspaper columnists who linked it with Kerr's oil and gas holdings. Kerr thought, and rightly, that he had been unfairly maligned; he was doing only what the Oklahoma Legislature had urged. But he is now insistent that his name be not identified with future measures. This not only removes grounds for attack but could make the bills more palatable to opponents.

It is possible both Johnson and Kerr will play "silent" roles in the behind-the-scenes maneuvering. As Senate majority leaders, Johnson will not want to arouse antipathy among senators from consumer states. He will need their support on other urgent legislation as the Democrats try to carve out a legislative program pointed at the 1956 presidential election. Johnson, himself, is regarded in some quarters as presidential timber. Therefore, he may want to disassociate himself—at least publicly—from whatever bill is pressed.

The fight is bound to divide the Democrats, who have attached the "give-away" label to some Eisenhower legislation. Nor will the probable schism be healed by the fact that the

GIVES SAME STRENGTH WITH LESS TONNAGE

Newport Steel THIN-WALL LINE PIPE

The high quality of Newport 4" and 6"* line pipe has its inception in the electric furnace, which produces finer steel under more rigid control. This better steel permits the making of *thin-wall* pipe which requires less tonnage, less freight, less pipe cost, while far exceeding the rigid specifications of API and ASTM. A basic steel producer for 70 years, Newport offers modern facilities, favorable location, capable staff and excellent service. Whenever you need 4" and 6" line pipe in the sizes shown, or any other of the products listed below, get in touch with Newport.

* SIZES AND WEIGHTS AVAILABLE

O.D.	Wall	Wt. Per Ft.
4½	.125"	5.84
	.142"	6.61
	.156"	7.25
	.188"	8.64
	.219"	10.00
	.237"	10.79
6⅝	.134"	9.29
	.156"	10.78
	.188"	12.89
	.219"	14.97
	.250"	17.02
	.280"	18.97

ECONOMICAL WATERAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to the entire area of the Middle West, South and Southwest.

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oil industry is accused of having poured money into some states in the recent campaign to try to defeat so-called liberal senators.

Ike will approve. There is general confidence that Eisenhower will sign a Kerr-like bill. He is dead against federal invasion of state's rights and ordered his National Fuels Resources Committee to look into the Phillips decision and propose corrective legislation. He moved in soon after Sen. Johnson lodged demands for action. But before that the President had signed into law the Hinshaw amendment to the Natural Gas Act, thus providing a clue to his position. This amendment, which he praised, provides that any company which buys natural gas at or within a state boundary is exempted from provisions of the Act if the gas is consumed within that state, and rates, services and facilities are regulated by a state commission.

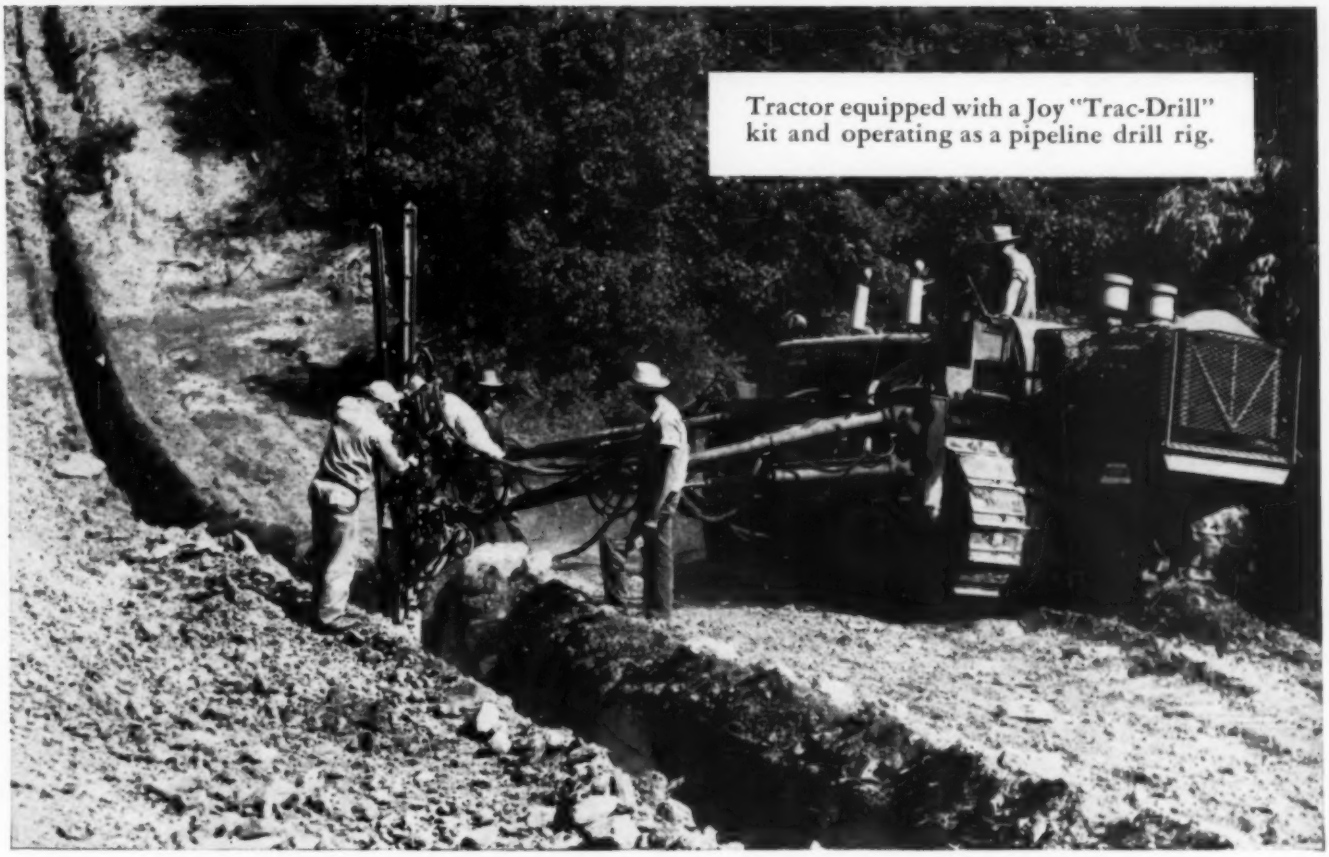
Basically, the issue posed by the Phillips edict is regional, pitting producers against consuming areas whose congressmen fear the absence of federal regulation will lead to price-gouging. It puts House members from the Southwest at a voting disadvantage because they don't have the numerical strength of their Northern brethren. But they always can resort to the perfectly legitimate practice of log-rolling—trading their support for pet Eastern and Midwestern measures—to attain their ends.

No such voting disparity prevails in the Senate, although there, too, log-rolling is traditional.

Opposing leaders. Probably spearheading the Senate fight to uphold the Phillips decree will be Sens. Estes Kefauver (D-Tenn.), William Langer (R-N.D.), Paul Douglas (D-Ill.), Hubert Humphrey (D-Minn.), Herbert H. Lehman (D-N.Y.), and Wayne Morse (Ind.-Ore.).

Kefauver and Langer plan to ask for $1 million to finance an investigation of monopolies by the Senate Anti-Monopoly Committee. They already have made clear they will shoot at oil and gas.

The Kerr Bill passed the Senate 44-38 on March 29, 1950. Here are



Tractor equipped with a Joy "Trac-Drill" kit and operating as a pipeline drill rig.

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A PIPELINER RIG THAT GETS THERE FASTER TO SAVE YOU TIME AND MONEY

This PIPELINER, the Joy "Trac-Drill," is a packaged drill-and-compressor unit for pipeline drilling that is easily assembled on *your* tractor. The assembly kit consists of drill and compressor "packages" and instructions for assembly. Drill package includes Joy Silver Streak Drills, Hydro Drill Jibs, mounting bracket, hydraulic pump and other accessories. Compressor package includes a Joy WL-80 compressor, mounting bracket, air receivers, etc.

Two drills are mounted on dual, hydraulically-actuated Joy Hydro Drill Jibs. With these jibs, the drills are quickly and easily positioned and are held absolutely stationary during drilling. This is a real "Pipeliner" rig . . . the double drill arrangement permits the drilling of several holes from each tractor setup.

The Joy "Trac-Drill" moves and operates as one self-contained unit. It moves in on those tough spots in the spread faster because there is no need to tow a separate source of compressed air into the area.

Consult a Joy Engineer TODAY for details on how you may equip your tractor for pipeline drilling. ● ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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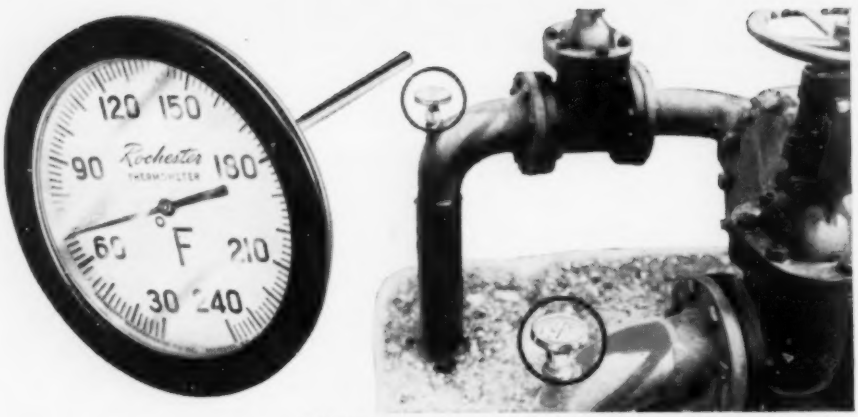

Rochester Thermometers give dependable service in this gas booster station.

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the senators—who will be around for the new Congress—who voted for it:

Johnson (D-Tex.), Anderson (D-N.M.), Bricker (R-O.), Bridges (R-N.H.), Byrd (D-Va.), Capehart (R-Ind.), Eastland (D-Miss.), Ellender (D-La.), Frear (D-Del.), Fulbright (D-Ark.), Hayden (D-Ariz.), Hickenlooper (R-Ia.), Holland (D-Fla.), Johnston (D-S.C.), Kerr (D-Okla.), Long (D-La.), McCarthy (R-Wis.), McClellan (D-Ark.), Martin (R-Pa.), Millikin (R-Colo.), Robertson (D-Va.), Russell (D-Ga.), Schoeppel (R-Kan.), Sparkman (D-Ala.), Stennis (D-Miss.), Watkins (R-Utah), and Young (R-N.D.). Sens. George (D-Ga.), and Malone (R-Nev.) were paired for it, making a total of 29—18 Democrats and 11 Republicans.

Here are the senators—also to be around—who voted against it:

Senate GOP Leader Knowland (Calif.), Aiken (R-Vt.), Chavez (D-N.M.), Douglas (D-Ill.), Dworshak (R-Idaho), Flanders (R-Vt.), Green (D-R.I.), Humphrey (D-Minn.), Ives (R-N.Y.), Jenner (R-Ind.), Kefauver (D-Tenn.), Kilgore (D-W.Va.), Langer (R-N.D.), Lehman (D-N.Y.), Morse (Ind-Ore.), Mundt (R-S.D.), Murray (D-Mont.), Neely (D-W. Va.), O'Mahoney (D-Wyo.), Saltonstall (R-Mass.), Smith (R-Me.), Thye (R-Minn.), Wiley (R-Wis.), and Williams (R-Del.) Paired against it were Magnuson (D-Wash.), and Hill (D-Ala.). Total 26-12 Democrats, 13 Republicans, and one Independent, Morse.

The Senate Commerce Committee lineup will be revised soon after Congress convenes January 5. Here is how it stands now, with the 1950 Kerr Bill vote indicated:

Republicans: Bricker, for; Schoeppel, for; Butler (R-Md.), Potter (R-Mich.), Duff (R-Penn.), Purtell (R-Conn.), and Payne (R-Me.), no stand indicated.

Democrats: Magnuson, against; Johnson (Tex.), for; Pastore, (D-R.I.), Monroney (D-Okla.), Smathers (D-Fla.), and Clements (D-Ky.), no stand indicated.

Democrats will control the revised committee. Whether it will include friends of the Johnson-Kerr bloc remains to be seen. **—The End**

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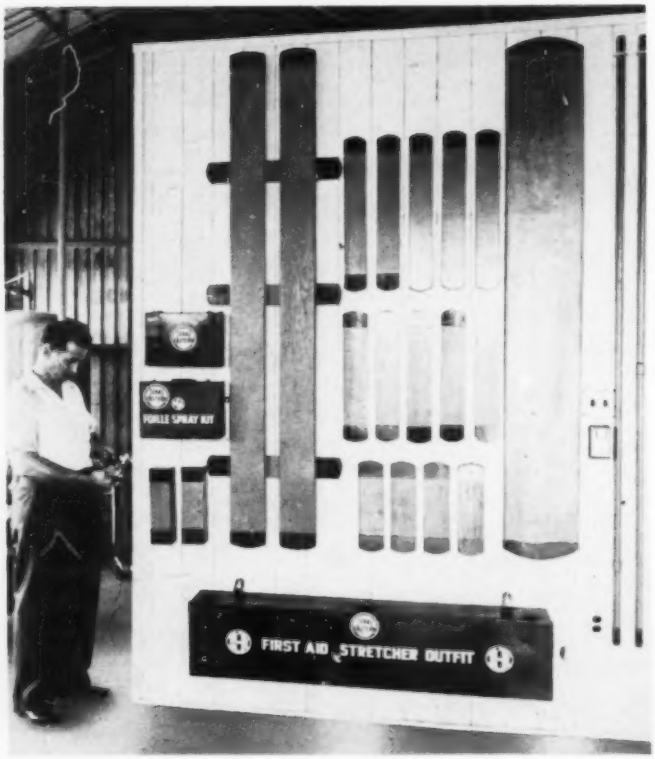


Mount First Aid Kit on Wall

More than just a neat arrangement, this display at Texas Eastern Transmission Corporation's Wheelersburg, Ohio, compressor station is made of splints and first aid kits carefully designed to serve a specific purpose when emergency treatment is needed.

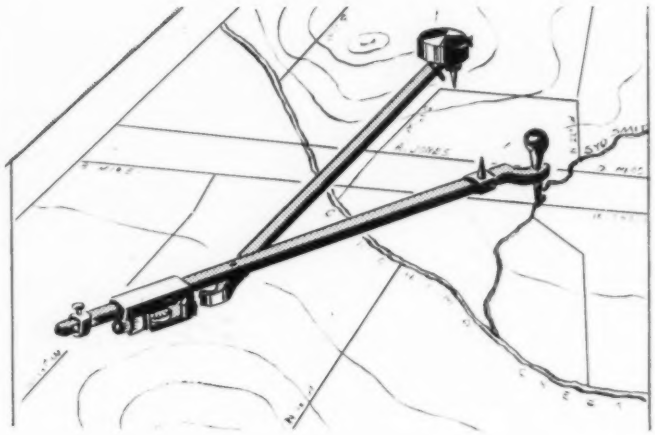
The long, wide board at right is a back, hip or leg splint; the narrow boards at left are back or hip splints. They can be quickly removed and used to keep an injured member or limb rigid temporarily while moving the patient. Smaller boards are hand and arm splints.

When a patient is laying on the floor or ground, splints can be set on the wooden blocks, at lower left, before they are applied so there will be space to pick up the splint without tilting the patient.

In the long kit at bottom is an emergency stretcher outfit, including a blanket. After folding the blanket in the prescribed manner, the long steel pipes at right can be inserted to make a stretcher.

Small kits contain first aid medical preparations and dressings.

Beside the board is George Kester, Texas Eastern division safety engineer.

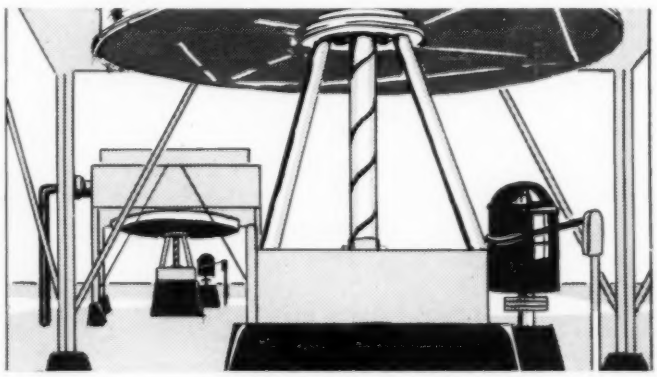


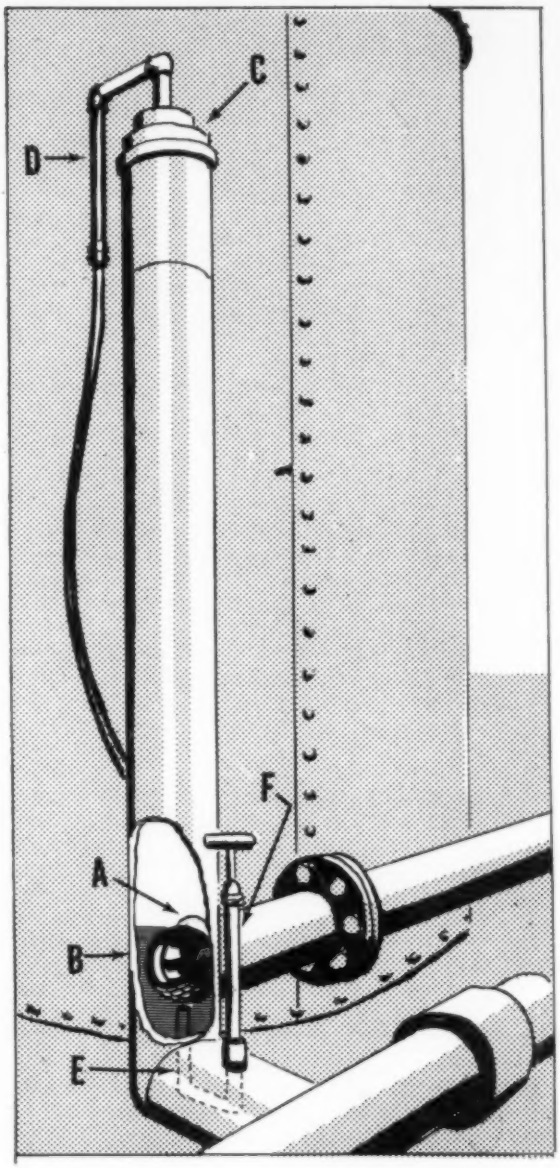
Planimeter Estimates Acreage

To obtain a rough estimate of acreage or square miles of odd-shaped pieces of land from a scaled map, use an ordinary planimeter, the type used to figure horsepower from engine indicator cards. Trace the boundaries of the land in question and read the results in square inches of area on the planimeter dial. With this information and the scale of miles on the map, it is simple arithmetic to convert the square inches on the planimeter dial to either acres or square miles.

Stripes Show Shaft Rotation

Paint a barber pole stripe on the shaft which drives the atmospheric cooling fan and make it easy for the operator to tell which units are in service. Ordinarily shafts are painted with aluminum, and it is almost impossible to tell from a distance whether or not a fan is running. Just a few cents worth of black paint spiraled around the shaft in barber pole fashion solves this problem.



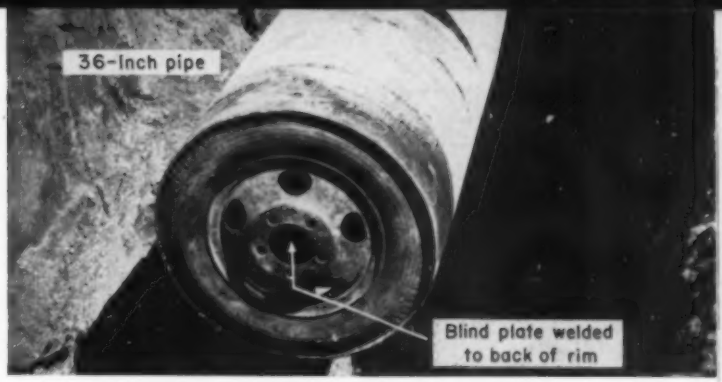


Install Float Chamber

Kaw Pipe Line Company has made it standard practice on its systems in northern Oklahoma and Kansas to install a shop-made float chamber on each tank battery to keep gas or air from entering the line and causing vapor locks as the tank empties.

The unit consists of a plastic ball floating in a standpipe mounted on a tee on the line leading from the tanks. The tee carries a ground seat (A) and, as the ball (B) floats down to the shutoff level in the tank, it makes a positive shutoff. When the ball rides near the top of the tank, it closes another seat (C) and prevents oil from running over. A small line (D) bleeds air off the top. The valve remains open during the operation of the unit.

Vacuum on the gathering line holds the float on the seat, even after the tank has refilled. To make it operative again, a rod (E), which works through a stuffing box (F), is installed. A lift on the handle pushes the ball loose from the seat and floats it again.

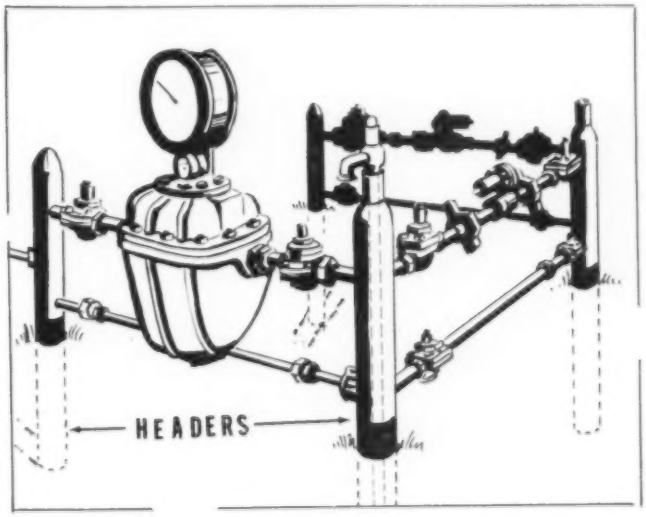


Use Tire for Night Cap

One of the problems Associated Pipe Line Contractors faced when laying Transcontinental Gas Pipe Line Corporation's 48 miles of 36-inch pipe in Mississippi and Louisiana was to find a night cap to fit the pipe. Conventional rubber gasketed ones were not available, and it was expensive and time-consuming to weld a bull plug on the pipe every night.

A pipeliner solved the problem when he found that the outside diameter of a truck tire would exactly fit the inside diameter of the pipe when the tire was deflated. When pressured, the tire exerted a force against the inside of the pipe proportionate to the penumatic pressure inside the tube. All that was needed to convert tire, tube and wheel into a serviceable night cap was to weld a blind plate on the inside of the rim.

Then, the pipeliners slipped the deflated tire inside the pipe and used either air compressor or hand pump to inflate it. To remove the night cap, they simply let the air out of the tire.

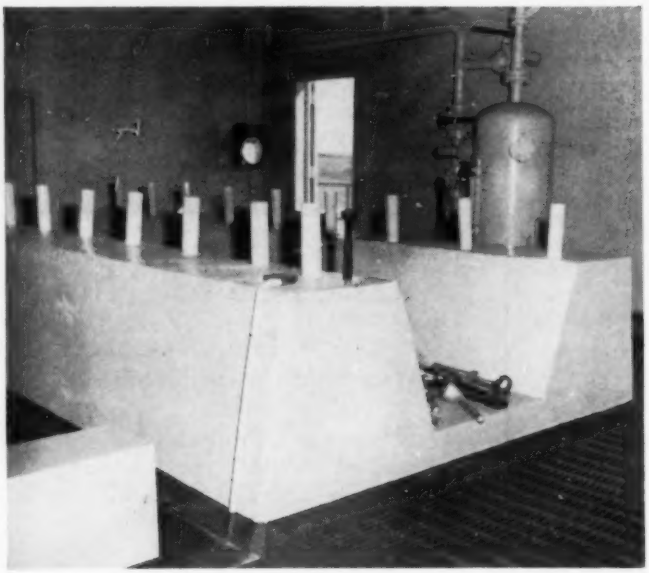


Headers Form Corner Posts

Vertical headers can be used to form the corner posts of a meter and regulator assembly. The headers are excellent for collecting dust and moisture and serving as volume chambers for gas as it is expanded.

Gas comes around this assembly in a clockwise direction, starting with the corner post in the background which is connected to the gas main. Note that the vertical header in the foreground serves as a drip, and water and condensation can be blown out from the bottom.

Mothball Spare Engine Foundation Bolts



Proper care and protection given to exposed, threaded anchor bolts on a spare engine foundation will eliminate grief and crew time when, perhaps several years later, the station capacity has been increased by adding the extra engine. One company makes it a practice, when finishing off and "moth-balling" engine bases, of equipping each exposed stud with a tubular cover which effectively protects threads from moisture and dirt. Easily made by a tinsmith, the light metal tubes are slightly longer than the length of the projecting bolt and are closed at the top. Painted at the time the base and other interior fittings are completed, these covers present a neat appearance and are readily salvaged for re-use when the engine is installed.

Threads of the bolts are carefully cleaned and given a coat of light grease before the cover is dropped down over it. Periodic checking of the bolts may be done quickly, as contrasted with the work entailed when studs are wrapped with an oily rag and tied down with twine.

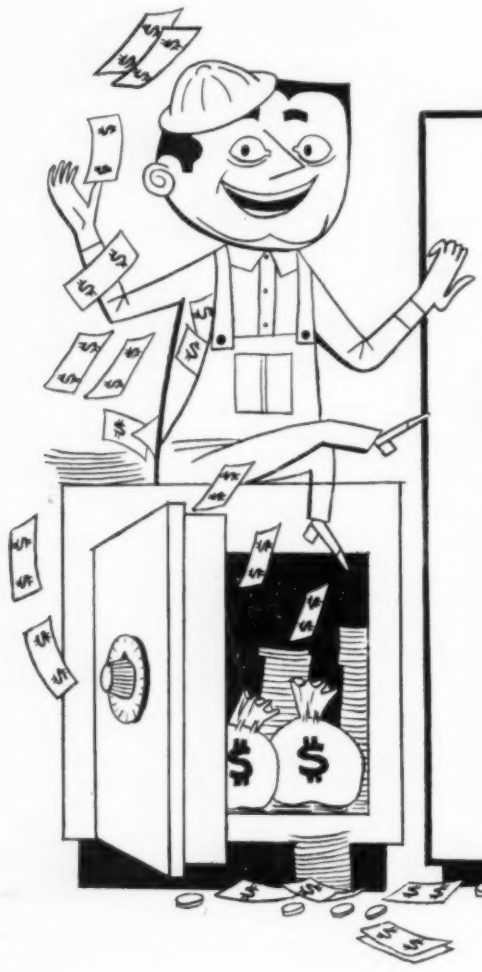
In the photograph, the bolt nearest the camera has been uncovered to show the relationship between height of the bolt and length of the cover.

Atomizer Makes Pattern For Cutting Gaskets

An atomizer loaded with chalk dust or talcum powder can be used to make an accurate pattern for cutting gaskets for flanges.

The common practice of hammering a gasket out of material laid over the flange results in inferior gaskets and sometimes in damage to the serrated face of the flange. On the other hand, tracing the pattern with pencil onto the gasket material is difficult and often inaccurate.

Here is an inexpensive method of obtaining the pattern. Simply outfit



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Graver Construction Co. has a wide background of experience in building pipeline stations for crude, product and natural gas. Specifications are rigidly followed, and every detail of construction is carefully controlled. These factors, combined with traditional Graver quality workmanship, have led those concerned with efficient pipelining to turn the job over to Graver.

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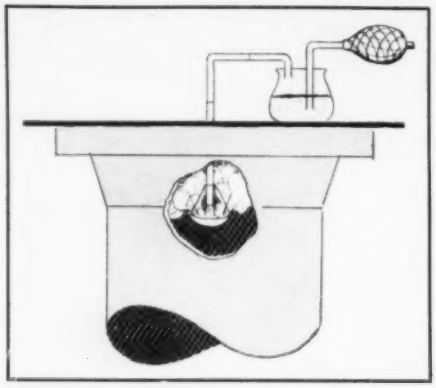

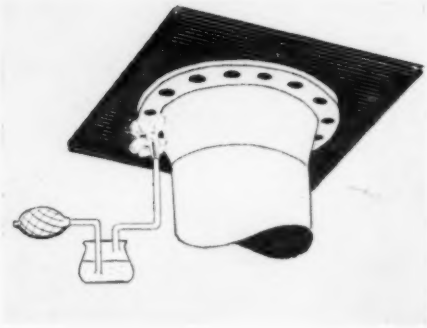

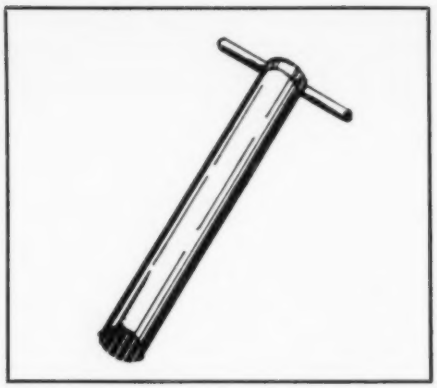

a dry type atomizer as shown in the illustration. Place the gasket material on top of the flange, and spray the inside of the gasket first, using the deflector as shown in the illustration. After the outside and inside have been marked, cut the gasket from the blank material, using a punch to cut the bolt holes.

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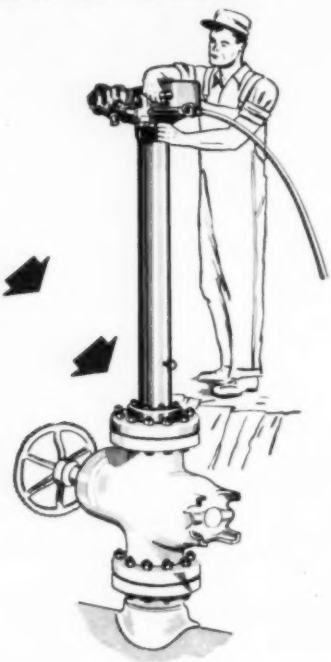

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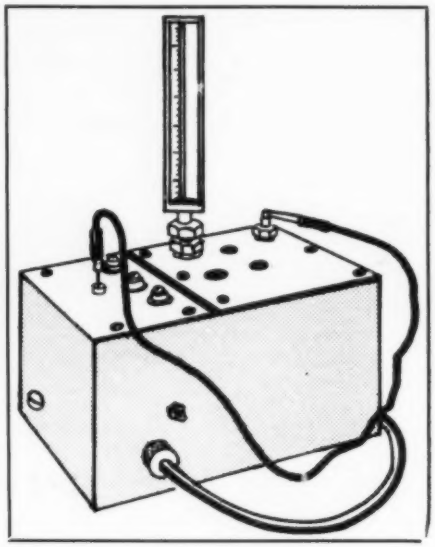

Device Allows Testing While Engine in Service

A high water temperature safety control testing device for compressor engines allows thermostat controls to be checked while the engine is in service. Heart of the device is a water bath compartment equipped with fittings in the cover to accommodate a thermometer and various types of high water temperature controls.

The bath is heated with a 600-watt submersion heater. A three-position switch allows a selection of "heat off," "heat on, uncontrolled," and "heat on, thermostatically controlled."

Three indicator lights on the unit are powered by a radio transformer. No. 1 light burns as long as the unit is plugged into a standard 110-volt, 60-cycle outlet; No. 2 light, when the heater is on; and light No. 3, connected with a test lead to the water temperature safety control of the engine being tested, burns when the

the "B-36"

...CROSSES A BOG IN MISSISSIPPI

• Some of the going on the Transco 36" gas line was extra tough. Here a long section is being lowered into one of the many bogs in Mississippi and Alabama.

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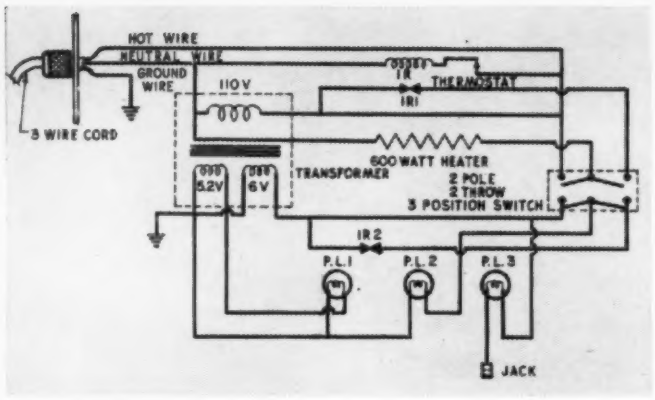

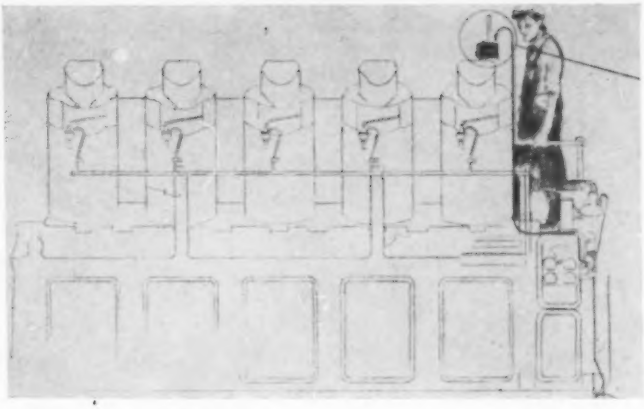

safety reaches its operating point.

Use of the tester in checking or setting high water temperature controls eliminates the need to raise the entire engine temperature a possible damaging 30 to 40 degrees.

The device provides an accurate and speedy check of thermometers also. The thermometer to be tested is placed in the water bath alongside one of known accuracy and the readings of the two checked throughout the operating range.

Labor and materials to build the device total about $63.

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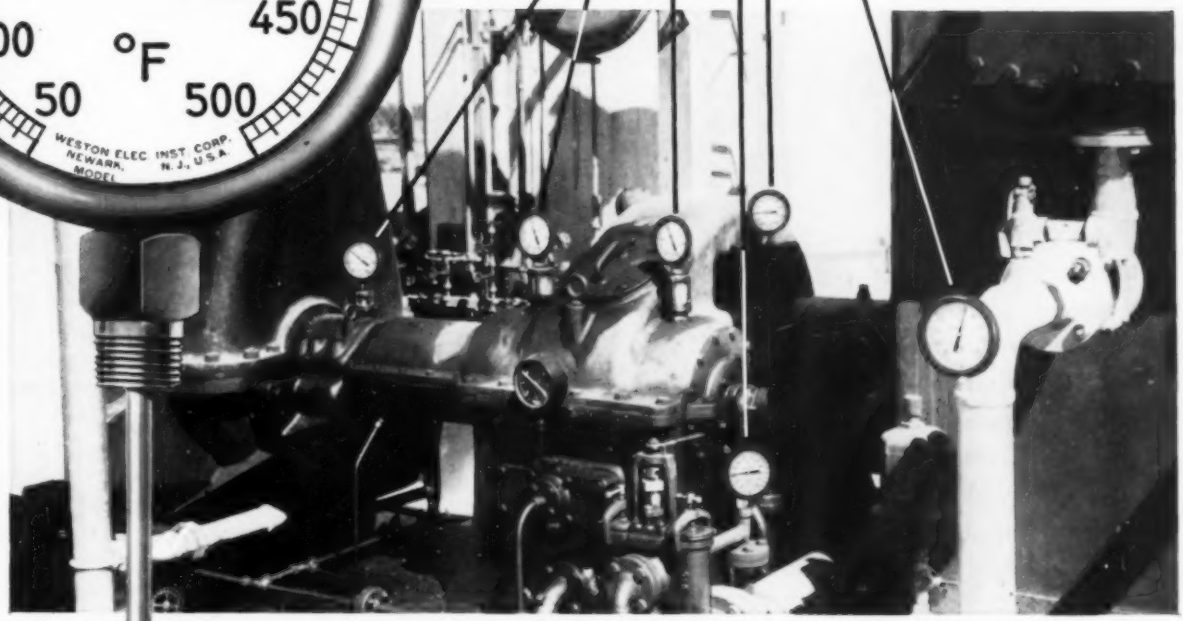

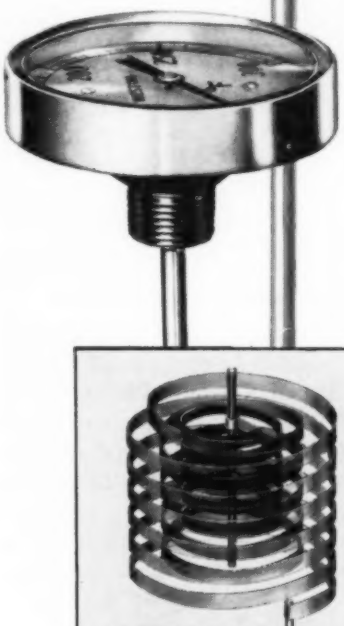

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IN PIPE LINE CONSTRUCTION

Wyoming-Nebraska Project Completed

The Wyoming-Nebraska Pipe Line Company's 220-mile, six-inch line from Cheyenne to North Platte, designed and supervised by the Gulf Interstate Engineering Company of Houston, was recently finished.

The line is the first project completed by Gulf Interstate Engineering, a subsidiary of Gulf Interstate Gas Company. The company was organized to undertake engineering and construction management of natural gas or petroleum pipe lines and allied facilities.

Construction of the Wyoming-Nebraska system was undertaken as a joint venture by Gulf Interstate, Houston Contracting Company and H. C. Price Company. Houston was in charge of laying the pipe and building terminal facilities.

The new line runs from Frontier Refining Company's tank farm at Cheyenne eastward to North Platte, Neb. Distribution terminals were built at North Platte and Sidney, Neb., and a pumping station was built at Cheyenne along with a dehydration plant and interconnecting lines with the Wyco Pipeline Company system.

First pipe was laid June 28. Construction crews were able to lay as much as three miles a day, permitting completion of the job ahead of schedule.

Because of the downhill course from Cheyenne to North Platte, minimum pumping facilities were needed. Elevations are 6030 feet at Cheyenne, 4064 at Sidney, and 2816 feet at North Platte.

Transco Submits 360-Mile Expansion Plan to FPC

Transcontinental Gas Pipe Line Corporation of Houston has revised its 1955 construction program upward. The project as revised includes construction of 361.5 miles of 36 and 30-inch pipe paralleling sections of the Texas-New York system; a total of 9,600 horsepower installed in two new compressor stations, miscellaneous additions to existing stations; approximately two miles of lateral line, and purchase meter and sales meter stations. Total estimated cost would run $48,205,000.

Approximately 292 miles of pipe line and other additions, totaling $38 million, were proposed in the earlier filing before the Federal Power Commission.

The company has also announced a $169 million refinancing operation involving the entire first mortgage pipe line debt, paving the way for $85 million of new financing to be carried out this year for 1955 construction.

When new facilities are completed, the company will have looped 45 percent of its more than 1800-mile cross country line. Complete looping is expected to be completed wthin the next few years.

The two lines will be spaced about 50 feet apart on the same right-of-way and tied together at block valves about every 17 miles.

Pacific Gas & Electric Builds 18-Mile California Line

An 18-mile gas line, to be built in Colusa and Glenn counties of California by Pacific Gas and Electric Company, will tap the new Beehive Bend and Princeton fields and bring additional natural gas into the middle Sacramento Valley.

The 12-inch line will run from the Beehive Bend area south to Princeton where a tap will run into the Princeton field. From Princeton the line will continue to a point about seven miles west of Gridley where the gas will be mixed with gas from the Wild Goose field and carried in a recently completed 16-inch line with connections to Yuba City, Marysville, Lincoln, and North Sacramento. Cost is estimated at $850,000.

Northern Natural To Build Canada-Minnesota Line

Northern Natural Gas Company, Omaha, has submitted to the Federal Power Commission a $32 million expansion program, proposing to import natural gas from Canada to serve markets in the midwestern U. S. Gas would be purchased from Trans-Canada Pipe Lines, Ltd., at Emerson, Manitoba.

Construction would include 188 miles of 24-inch main line from Trans-Canada's system at Emerson to Wahpeten, N. D.; 215.3 miles of 30-inch from Wahpeton to Northern's main system at Farmington, Minn.; a 4000-horsepower compressor station at Pembina, N. D.; and branch line facilities to service 11 communities along the Emerson-Farmington line.

New Natural Gas Pipe Line Nears Completion in Ohio

Construction has begun on a 20-inch line for Ohio Fuel Gas Company of Columbus, Ohio. The $600,000 pipe line will deliver natural gas from underground storage 10.5 miles to homes in Columbus and other central Ohio communities.

Part of a $33 million improvement program authorized by Ohio Fuel Gas in 1954, the line, in Hocking and Fairfield counties, is expected to be in full operation soon.

Two Gas Pipe Lines Planned in Colorado

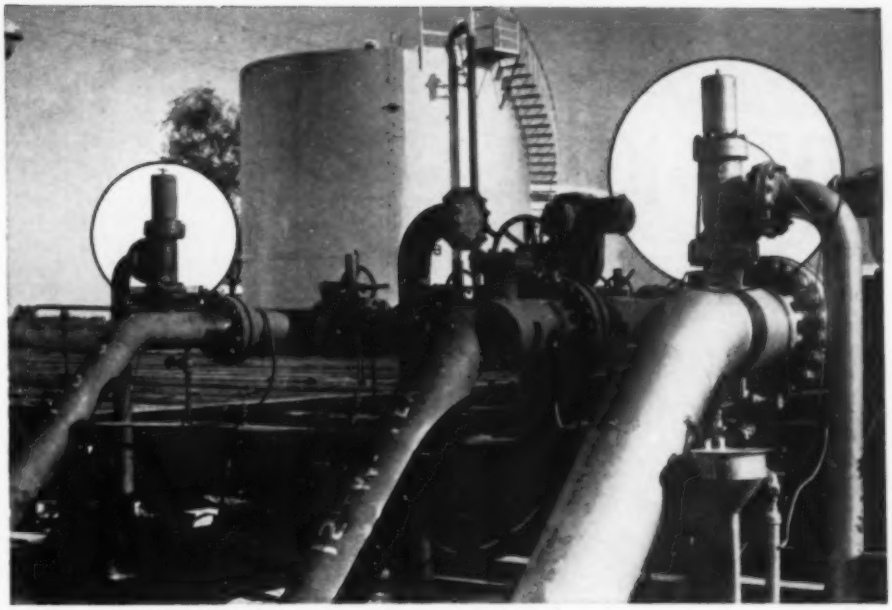
Applications for natural gas pipe lines to cost an estimated $1 million were submitted recently to the Colorado Public Utilities Commission for approval.

Midwest Natural Gas Corporation plans to construct an 80-mile line to serve several El Paso and Douglas County communities. Cost is estimated at $750,000.

Loran L. Laughlin of Goodland, Kansas, has applied for authorization to extend gas service 12 or 13 miles west from Manitou Springs with a line estimated to cost $250,000.

The Midwest line would serve Louviers, Sedalia, Larkspur, Palmer Lake, Monument, Husted, the new Air Force Academy site and the Black Forest area.

Laughlin's line would run from Manitou Springs westward to Ute Pass.



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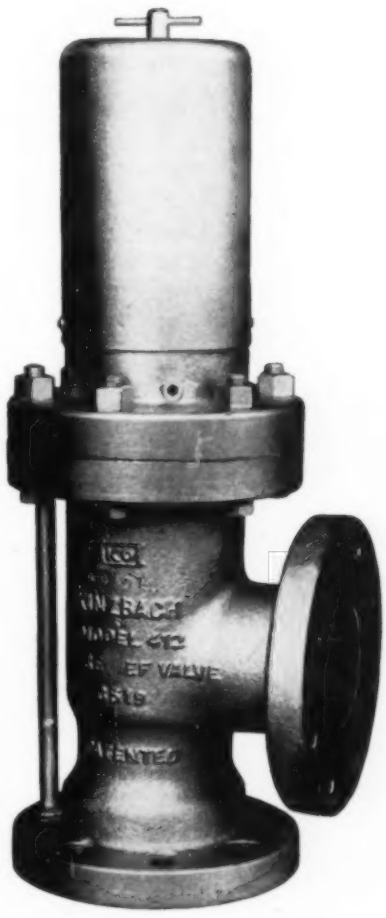

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Texas Gas Announces 1955 Expansion Plans

Texas Gas Transmission Corporation of Owensboro, Ky., plans to lay 81 miles of 26-inch loop line and a new lateral into southern Indiana, as a part of its 1955 expansion program. Upon completion, Texas Gas will have completely looped its system from Bastrop, La., to Kentucky, with a four-line system from Monroe, La., north to Memphis.

A second expansion plan, planned for 1956, will add 85 million cubic feet of gas to the system's capacity.

This two-step expansion program was devised to speed Federal Power Commission authorization as Texas Gas has enough reserves to support the first step without signing new supply contracts.

A merger proposed to the FPC in December to bring the company subsidiaries, Louisiana Natural Gas Corporation and Texas Northern Gas Corporation into the parent company, would simplify the corporate structure and provide sufficient bondable property additions to allow Texas Gas to finance the first phase of the construction program through sale of a new series of first mortgage pipe line bonds.

United States Firm to Build $2.5 Million Bolivian Line

The Bolivian government has approved a $2.5 million contract with an American firm for the construction of a 6-inch oil pipe line from Camiri to Yacuiba on the Argentine border. Construction began in November.

A German firm is providing the necessary 6600 tons of 6-inch pipe at a total cost of $1,164,900. YPFB, the Bolivian petroleum agency, also has been authorized to spend $246,000 for additional equipment required in putting the new line into operation. Completion is scheduled for May or June this year.

Cherokee Pipe Line Loop Completed in Oklahoma

The 23-mile, 8-inch Hewitt-to-Tussy loop on the Cherokee Pipe Line Company system has been completed. Built to provide more selective transportation of crude, it will enable Cities Service Oil Company, part owner of Cherokee, to bring sweet oil up from the Hewitt area of southern Oklahoma, while moving sour oil south on the Cherokee main line.

At Maysville, Okla., natural gasoline made at the Maysville gasoline plants will be injected, given a low-cost ride with oil through part of the Cherokee line, and then turned over to Texas-Empire pipe line for delivery to the East Chicago refinery.

Mid-Saskatchewan Line Nears Completion in Canada

Completion by the end of December was scheduled for the Mid-Saskatchewan Pipe Lines Ltd. outlet for Smiley Field, a 1953 discovery which now constitutes Saskatchewan's largest light gravity crude reserve.

A 15-mile system of 3- and 6-inch gathering lines and 24 miles of 6- and 8-inch main line are being built. Main line runs from the field to Kerrobert, a pipe line station on the Interprovincial Pipe Line.

Bannister Construction Company has the contract for ditching, welding, and coating the line.

Phillips Plans Submarine Lines Off Louisiana Coast

The Phillips Petroleum Company, Houston, has applied for a Department of the Army permit to install 2- and 3-inch oil or gas pipe lines out approximately 21 miles from Cameron, La., into the Gulf of Mexico.

The proposed lines will run from a point seven miles east of the mouth of the Mermentau River, south, 5000 feet to an existing platform. They will be laid at a depth of 3 feet below bottom from shore to —12 feet MGL. Depth on the bottom will be more than —15 feet MGL.

Champlin Refining Builds Oklahoma Products Line

Champlin Refining Company, subsidiary of Chicago Corporation, will build an 81-mile 6-inch products pipe line from its Enid, Okla., refinery to Oklahoma City. Cost is estimated at approximately $1 million.

The line will carry gasoline and other crude oil products to Oklahoma City markets. Construction was necessitated by a $4 million expansion program of the Enid refinery.

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PIPE LINE INDUSTRY'S VIEWS OF THE NEWS

HEADLINES OF THE MONTH

• FPC kills escalation, favored nation clauses . . . • Legislative outlook is for delay in tax cuts, extension of Reciprocal Trade Act . . . • Coal may be seeking trade-out . . . • Texas allowable upped again as imports debate grows hotter.

Escalation Clauses Killed

The Federal Power Commission's new order 174-B has, for all practical purposes, killed escalation and favored nation clauses in natural gas sales contracts. Willard W. Gatchell, commission general counsel, made that unmistakably clear in a statement to WORLD OIL in Washington.

He admitted that what the FPC has done, in effect, is state a new policy which supersedes much of that covered in original orders 174 and 174-A. He emphasized that the commission dislikes both clauses and, through order 174-B, has put the oil and gas industries on notice that neither will be recognized after May 1, when the new order becomes fully effective. He added that if such contracts are negotiated between now and May 1, it will be at the participants' own risk. There may be some exceptions, Gatchell said. But he could call none to mind at the moment.

Industry men in the nation's capital agreed that that was what the order meant. They met informally on how it should be interpreted for their various organizations.

Meantime, Federal Judge Alexander Holtzoff, in Washington, granted the Union Producing Company, subsidiary of United Gas Pipeline Company, a permanent injunction against FPC enforcement of orders 174 and 174-A on grounds the commission put them into effect without adequate hearings. Next question is what the commission or Union Producing can or will do about superseding order 174.

Industry sources look for Gatchell to return to court with a plea that both old orders have been superseded and therefore the issue raised by Union Producing is moot. He can point out that public hearings were held on the escalation and favored nation issues November 4-5 and that order 174-B is based on them.

It is clear in any event that the industry is fighting a back-and-fill action—what one spokesman termed "buying time"—to delay full enforcement of the FPC's gas price regulations until such time as Congress can pass legislation circumventing the Supreme Court's Phillips case decision that the FPC must regulate the price of gas from wellhead to interstate consumer.

Some industry circles believe 174-B may end some of the confusion surrounding powers of state commissions. The order quotes the 1938 Natural Gas Act, as it touches on abandonment of service to producers, and adds that "nothing in the FPC rules shall be construed to interfere with valid conservation orders of a state agency." These same circles, however, foresee this as the basis for lawsuits between the various producing and pipe-line interests.

Industry leaders were much displeased with the commission's failure to give a flat definition of who can be regarded as an independent producer. One spokesman said this leaves the question of the commission's jurisdiction "wide open." Commissioner Seaborn L. Digby agreed in a sharp dissent from 174-B. He warned that "hundreds of producers will file applications and rates in transactions entirely outside FPC jurisdiction." Digby also asserted that all fixed escalations in contracts which were in existence when 174-A was issued "should be accepted as part of the original rate and constituting one tariff on rate schedules not subject to suspension under the Natural Gas Act." But Commissioners Nelson Lee Smith and Frederick Steuck insisted the commission majority had not foreclosed further consideration of these issues.

Highlights of 174-B:

- Acceptance of gas purchase contracts in support of certificate of necessity filings shall not be construed as approval of the rates therein.
- Escalator clauses submitted after May 1 will not be considered in support of any certificate application if they provide for adjustment of a seller's price due to changes in prices received by the purchaser when he resells the gas.
- No recognition of seller's price adjustment by reason of payment of higher prices by other purchasers in the same or other producing areas.
- Operators selling gas in interstate commerce after processing and gathering, can make necessary rate and certificate filings for producers as a group, those co-owned, and those united for production and sale.

Here's Legislative Outlook

What about the legislative outlook in the Democratic-controlled 84th Congress which convenes January 5? Veteran congressional observers take this view of those issues in which oil has big stakes:

Taft-Hartley labor-management act — Will be kept virtually intact. A strong coalition of conservative Southern Democrats and Northern Republicans will see to that. But they'll have to beat back pro-labor, liberal colleagues who know they can't repeal the law but would rewrite it. President Eisenhower will suggest changes, among them a ban against employers hiring non-strikers during a strike, and to require employers, as well as union officials, to sign non-Communist oaths. These amendments may pass. On the other hand, a liberal drive, backed solidly by labor, to scuttle right-to-work laws in 17 states will fail. These laws prohibit compulsory union membership. Taft-Hartley permits this but recognizes the precedence of state laws. Secretary of Labor James P. Mitchell has denounced the laws and wants Taft-Hartley changed to supersede them. Secretary of Commerce Sinclair Weeks upholds them. President Eisenhower has taken no side—as yet. A year ago he suggested the states be given more, rather than less, jurisdiction in labor-management relations. The trend in the National Labor Relations Board is in that direction.

Minimum Wage — Democrats are expected to support Administration proposal to increase national minimum wage—affecting 24 million workers—from present 75 cents-an-hour scale to 80-90 cents. Strong Southern opposition certain but outlook for passage is bright.

Taxes—Corporation and excise cuts due April 1 will be postponed. President has warned the $3 billion revenue involved is needed urgently to reduce a threatened $5-to-$6 billion dollar deficit in fiscal 1955-56 in the face of a $63 billion budget. Democrats expected to see eye-to-eye with this, but may try to repeal sliding-scale tax on dividends and substitute

lower exemptions for low-bracket taxpayers. Corporation tax is due to drop from 52 percent to 47. Industry favors it as an incentive to increased production.

Reciprocal Trade—Most Democrats and middle-of-the-road Republicans will support President's request for a three-year extension under which he would be allowed to cut tariffs as much as 5 percent a year for a total of 15 percent. Strong opposition expected from conservative, or protectionist, Republicans as well as oil and coal state legislators who are fighting imports.

Natural Gas—Strong Senate and House blocs organizing to upset Supreme Court decision that Federal Power Commission must regulate the price of natural gas from wellhead to Interstate consumer.

Anti-Trust and Fair Price Laws—Democrats determined to strengthen anti-monopoly statutes and kill Supreme Court-endorsed state fair price laws. Outcome conjectural.

Atomic Energy—Democrats plan drive to head off President's so-called "give-away" program under which Administration is trying to induce private enterprise to take greater part in exploiting nuclear energy for industrial and other peace-time purposes. Outlook uncertain. In same vein, Democrats will try to kill Dixon-Yates power contract under which the private utility concern would supply energy to Atomic Energy Commission through Tennessee Valley Authority.

Foreign Aid and National Defense—Democrats already have pledged Mr. Eisenhower there will be little controversy in these fields; that he will get substantially what he asks. Some Democrats are inclined to give him even more.

Other issues on which it is too early to prophesy action are health re-insurance which died in the last Congress; safeguards for small business, which will have a loud voice in the new Congress; and expansion of social security to embrace millions of disabled workers.

'Inch' Hearings Begun

Federal Power Commission indicated last month that its interest in the proposal by Texas Eastern Transmission Corporation to convert a part of the "Little Inch" pipe line system from natural gas to oil products is the effect on gas consumers.

Thus, FPC's decision on the matter will be based on whether the "Little Inch" may be taken out of gas service without affecting adversely the public market. American Pipe Line Corporation and barge line operators were appearing at the hearings to oppose the conversion proposal.

In brief . . .

Panhandle Eastern Pipe Line Company has filed a protest with Philadelphia Circuit Court of Appeals on Federal Power Commission's approval of the building of a natural gas line to Detroit by American Louisiana Pipe Line Company. In challenging American Louisiana's supply, market, financing, and rates, Panhandle Eastern charges that FPC approval was in error.

Barring unfriendly government attitudes and too many political and military upsets in the world, J. T. Duce, Arabian American Oil Company vice president, believes natural gas pipe lines will be built from Middle East fields to Europe, India and Pakistan some time in the future.

Oral arguments on methods and principles for determining the rate base for independent natural gas producers, originally scheduled by Federal Power Commission on December 15, will be heard January 11.

Tide Water Associated Oil Company will spend more than $127 million this year on exploratory operations, refining and distribution. This is the largest sum ever budgeted by the company for a single year's capital outlay.

F. M. Banks, president of the American Gas Association, was the lone new member among the 62 appointed to the Gas Advisory Council by Interior Secretary Douglas McKay. The council consults with McKay and the Oil and Gas Division on natural and manufactured gas matters involving national defense.

About 3000 applications were received by the Federal Power Commission for natural gas company certification in accordance with Order 174-A by the December deadline. The figure does not reflect the number of producers who filed, since some applications were filed jointly by several producers and several gas sales contracts were filed by a number of companies individually.

The 2-cent federal tax on gasoline amounted to $835,609,000 during the fiscal year ending June 30. Lubricating oil revenue totaled $68,441,000. Because of changes in excise collections, fiscal 1954 collections do not include revenues for four full quarters.

Kuwait Oil Company and the Sheik of Kuwait are expected to soon begin negotiations on the revision of 1951 royalty terms.

Coal Craves to Bargain

The coal industry last month threatened to force into close relationship oil's two great problems—the overthrow of the Phillips gas decision, and easement of oversupply.

Throughout the long Phillips case coal has clamored no less loudly than oil for freedom from government regulation. Coal reasoned that an unregulated gas industry would boost gas prices to a level competitive with coal.

But last month coal struck up a new tune that sounded like an overture to a bargaining session. L. C. Campbell, president of the National Coal Association, reporting on a Washington meeting of a Special Committee on Competitive Fuels, said "the committee gave consideration to the so-called Phillips decision . . . but the committee at this time has taken no position on the question of whether or not that decision should be retained or reversed."

Speculation was that coal was offering to back oil's stand in the Phillips case for a price. Conceivably, that price might be oil's backing of import quotas on residual oil. Campbell said the National Coal Association favors "quantitative restriction on such imports and an equalization of tariffs on residual oil with other petroleum products."

Coal might also be prepared to demand gas cooperation on coal's drive against "dumping of natural gas at a price less than the average cost at the point of consumption, plus a reasonable profit," and for coal's demand that imports of natural gas be curbed.

Will Ike Back Imports Bill?

Speculation as to whether the next Congress will curb imports through legislation backed by the President was confused by an announcement from on high last month.

It was announced that the Administration will ask Congress to give high priority to a liberalized foreign trade program, including authority for the President to make sharp tariff reductions. Washington observers took this to mean the President would not favor new trade restrictions, including legislative curbs of imports.

The announcement followed by a few days a Fort Worth rally of Texas independent producers at which it was determined to muster all the nation's independents behind congressional legislation to curb imports.

At that meeting:

- Jack Porter, Houston independent and Republican national committeeman from Texas, declared he had been corresponding with the President concerning imports and

that the chief executive is concerned over the matter.

• Gen. Ernest O. Thompson of the Texas Railroad Commission also raised the independents' hopes by saying he understood the President's Cabinet committee was giving careful study of the effects of imports on the over-all economy of the nation.

• Sen. Price Daniel of Texas, who certainly recognizes the value—if not the absolute necessity—of the President's approval of imports-curbing legislation, promised to push toward legislation any "reasonable plan" adopted by the nation's independents. Daniel also declared that congressional action seems the only answer to the imports problem, "industrial statesmanship" apparently having failed.

Meanwhile, in Washington, Senate Majority Leader Lyndon B. Johnson, another Texan, was reported to have given the President a pledge of general support for his foreign trade program, which is expected to include a three-year extension of the Reciprocal Trade Agreements Act.

Texas Allowable Up Again

Gen. Ernest O. Thompson carried his fight against high imports into the Texas Railroad Commission's proration hearing and emerged with a 257,307-barrel hike in the permissible flow for January.

The allowable was set at 3,216,123 barrels. This exceeds the 1954 peak of 3,115,463 barrels reached in April, but is substantially below the all-time high of 3,387,279 set in November, 1952.

Declared Thompson: "We've been showing great restraint on production, while some other states have not. We might have a bad winter . . . which would open the way for people to say we need more imports. If sotcks pile up, maybe importers will take heed."

An 18-day pattern was adopted after Gen. Thompson and Commissioner Olin Culberson said it would help combat imported crude and would prevent a possible shortage during the winter heating oil season.

W. J. Murray, Jr., who was elected chairman for 1955-1956 to succeed Gen. Thompson under the commission custom of annually passing the chairmanship among the members, declared the increase was so large that it made him "nervous." He agreed to it with the comment that industry should recognize the probability of a cut-back if stocks increase.

Only Sun Oil Company and Shell Oil Company actually recommended the 18-day schedule.

LPG Group Fears Ruling

One more resolution has been adopted urging Congress to amend the Natural Gas Act. This time, the National Council for Liquid Petroleum Gas Promotion has spoken.

Federal control of the natural gas industry resulting from the Phillips case decision, says the organization, would curtail the supply of liquefied petroleum gas and would be a blow to the LPG industry.

James E. Pew, Sun Oil Company director and council president, announced approval of the resolution. He said that not only does the natural gas industry bear no resemblance to a public utility but also it is highly competitive, requiring great risk to find its reserves.

"The effect of federal regulation of the natural gas producing industry would be a diminishing output, resulting in a decline in the supply . . . this would mean a shortage of the fuel, now used in millions of farm, suburban and small town homes for cooking, water heating, house heating, refrigeration, clothes drying, and incineration. It would also curtail the availability of LP-Gas for tractors, stock tank heating, chicken brooders and other agricultural uses as well as for many commercial and industrial applications."

Industry's Position Stronger

Petroleum use will show its 12th annual gain when the figures are added for 1954, it was predicted by Frank M. Porter, API president.

Porter noted that the statistical position of the industry is considerably stronger than earlier in the year, and even stronger during the late summer. But he indicated that the situation is still such as to advise caution, particularly with respect to crude runs to stills, relative product yields, the demand for fuel oils this winter, and for gasoline in next summer's high-consuming season.

In addition to the slackening in consumer demand, other factors contributing to 1954's slower pace in the domestic industry were a substantial decrease in exports, the post-Korean decline in military requirements, and the modest slump in general business activity.

He said domestic demand during 1954 is estimated at 2 billion, 824 million barrels, up 39 million over 1953. Domestic supply is estimated at 2 billion, 557 million, a decrease of 45 million. Of the latter, 2 billion, 312 million are crude, and 245 million are natural gas liquids. Although the over-all total of liquid hydrocarbons is down, production of natural gas liquids represents another all-time peak. Natural gas output also moved upward, reaching 11 trillion cubic feet, an increase of more than 368 billion cubic feet.

The API president said drilling activity set a new record of 53,000 wells completed, an increase of 3500 over the preceding year. Significantly, more than one-third of these were dry holes, which emphasizes the increasing financial risk in searching for oil, and the correspondingly higher cost of finding new reserves.

Other principal statistics for 1954:

Year-end stocks—719 million barrels, down almost 9 million from 1953.

Operable refinery capacity—8,379,000 barrels daily, up approximately 372,000.

Crude runs to stills—2 billion, 531 million barrels, down 24 million.

Output of refined products included:

Motor fuel—1 billion, 265 million barrels, down 2 million.

Distillate fuel oil—538 million, up 10 million.

Residual fuel oil—415 million, down 34 million.

Total fuel oil — 953 million, down 24 million.

Kerosine—122 million, down 825,000.

Proved reserves of liquid petroleum and natural gas were believed to have moved to new peaks in 1954. The report on reserves will not be available for some time, but industry circles expect to see an increase in total reserves as a result of this year's intensive drilling program. At the beginning of 1954, U. S. reserves of liquid hydrocarbons amounted to 34.4 billion barrels, an all-time high.

OWIU's 1954 Score: Zero

O. A. (Jack) Knight's magic number in 1954 was zero.

That is exactly what the OWIU president scored in a series of frontal and flank attacks on the oil industry.

Here is Knight's 1954 record, in brief:

Wage increases won: None. He charged the industry took advantage of his no-strike pledge, now withdrawn, to impose a collusive freeze-out against demands for a general 5 percent wage hike.

Successful mergers: None. Knight's cherished plan for a million-man coalition of oil and chemical unions collapsed. He hopes to salvage part of it by merging with the CIO United Gas, Coke and Chemical Workers in February. But that proposed 200,000-man combine still can explode. Elements in the UGCCW will not go along if there is any chance their union will be "swallowed up."

Moreover, President Dave McDonald of the CIO United Steel Workers, who has no use for CIO President Walter Reuther, a sponsor of the OWIU-UGCCW merger, has offered the chemical workers a huge organization fund if they'll align with the steel workers. Time will tell how tempting that bait is.

On the other side of the ledger, Knight achieved moderate success in a membership drive.

"Our Latest"

We have a brand new "baby" christened the "Collins Friction Transposition Method."* This is our most startling development since the advent of our Submarine Pipeline Trencher (U. S. Patent No. 2,602,300).

We predict that this new method will completely revolutionize submarine pipeline laying technique. We can now lay the longest and deepest submarine pipe lines with comparative ease.

HERE ARE THE POSSIBILITIES:

up to — 6 miles of "Big Inch" submarine pipeline laid every 24 hours

2600 foot depths—limited only by the strength of the pipe.

100 miles in length

Readily adaptable to swamps and lowlands—
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*U. S. and Foreign Patents Pending.

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Pipe Line Men

IN THE NEWS

Sydney S. Smith, retired manager of the Products Pipe Line department of **Shell Oil Company,** has announced the opening of his office as pipe line consultant in New York City. After leaving college, Smith went into business with his father selling and installing compressor equipment for oil recovery operations in West Virginia. In 1924 he joined Roxana Petroleum Corporation in Tulsa, and 18 months later was made manager of the Natural Gas-Gasoline department. For three years he was special consultant to Shell's manufacturing division before taking over managership of the products pipe line division. He retired in August, 1954.

Sydney S. Smith

•

Byron E. Francis has been named chief engineer of **Northern Natural Gas Company,** succeeding **Martin C. Madsen.** Francis joined Northern in 1939, and was appointed assistant to Vice President Joe T. Innis in 1942. From August, 1952, to June, 1953, while on leave of absence, he served as assistant to the director of the Gas Facilities division of the Petroleum Administration for Defense in Washington, D. C.

B. E. Francis

Oma R. Bates, Interstate Oil Pipe Line Company's public relations representative, was presented the Silver Award for meritorious service by the American Petroleum Institute's Oil Industry Information Committee at the annual Gulf-Southwest District meeting. Bates has served as area co-chairman for northwest Louisiana of the Oil Industry Information Committee the last two years.

•

The board of directors of **Platte Pipe Line Company** has elected two new directors. They are **R. F. Sturgis, Jr., Chicago,** treasurer of The Pure Oil Company, who replaces **J. W. Meehan** of Pure; and **D. R. Williams,** Findlay, Ohio, manager of the Crude Oil Trading department of The Ohio Oil Company, who replaces **J. R. Donnell** of Ohio.

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LIVINGSTON, TEXAS

E. C. Michels

James C. Phelps

E. C. Michels, Salt Lake City, has been appointed superintendent of the products division of the newly organized **Cherokee Pipe Line Company,** a subsidiary of Continental Oil Company.

Formerly superintendent of Pioneer Pipe Line Company at Salt Lake City, he will make his new headquarters at Ponca City. He will be succeeded at Salt Lake City by **James C. Phelps,** formerly senior office engineer at Ponca City for Continental Pipe Line Company.

Michels joined Continental Pipe Line Company in 1950 in Ponca City and transferred the following year to McAllen, Texas. He was a pipe line engineer at Lance Creek, Wyo., and Ponca City before becoming superintendent in 1952 of the Pioneer Pipe Line Company, which is owned by Conoco and Sinclair Pipe Line Company.

Phelps joined Continental at Ponca City in 1953.

•

L. H. True, president of Magnolia Pipe Line Company, was recently re-elected chairman of the **Committee for Pipe Line Companies,** an association of nearly all the nation's interstate and large intrastate carriers of crude oil and petroleum products. Other officers named were **O. Q. Lomax,** president of Humble Pipe Line Company, vice chairman; and **Paul J. Bond,** vice president of the Pure Transportation Company, treasurer.

•

John H. Crump has been elected a director of **Commonwealth Gas Corporation.** Associated with the company for the past nine years as chief geologist and development engineer, he has also been a vice president and director of Commonwealth's subsidiary Southwest Gas Producing Company, Inc.

ON BADGER PIPELINE sections recently completed, Contracting and Material Co. of Evanston, Ill. reported their Cleveland "240" stayed well ahead of the pipe gang even where they encountered tough digging like that shown. Get further information on the "240" for your 1955 trenching requirements from *your Cleveland Distributor* or from *The Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio.*

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Elmo K. Ballard, formerly with **Standard Oil Company of Indiana,** has been named manager of supply and distribution for the recently organized **Valley States Oils, Inc.,** Memphis, Tenn. He has opened an office in Chicago for Valley States at 600 South Michigan Avenue.

With the Standard organization since 1933, Ballard has been assistant to the Standard vice president in charge of sales and his work has consisted of handling bulk sales including exchange and purchases of refined products.

Valley States was recently organized to sell the products of Sunray Oil Corporation and Kerr-McGee Oil Industries, Inc., delivered through the new Oklahoma Mississippi River products pipe line to a new West Memphis, Ark., marine terminal from the companies' refineries in Oklahoma.

Conference Room Feature

John H. Williams, president of Williams Brothers, pipe line constructors, points out on a map in the company's newly remodeled conference room one of the firm's most interesting jobs in recent years. Rowland Stanfield, vice president, stands by. Company offices are on the third floor of the National Bank of Tulsa Building.

Paul B. Rutledge, coordinator of employe activities, Michigan-Wisconsin Pipe Line Company, Detroit, has been elected chairman of the **American Gas Association** Midwest personnel conference.

Other officers of the conference are Armond Harris, administrative assistant, Northern Natural Gas Company, Omaha, vice chairman; and P. S. Hopkins, personnel director, Metropolitan Utilities District, Omaha, secretary.

Rutledge has been a member of A.G.A. for four years and last year served as vice chairman of this conference.

•

W. L. Kygar, Ponca City, president of **Continental Pipe Line Company,** has been elected president of the recently organized **Cherokee Pipe Line Company.**

Continental Oil Company and Cities Service Company each own a 50-percent interest in Cherokee Pipe Line Company, which was organized last July to purchase a 1,050-mile crude oil pipe line gathering and trunk system in Oklahoma and two crude oil lines extending 395 miles from Glenn Pool, Okla., to Wood River, Ill. Cherokee assumed ownership of the new lines September 1.

Other officers of Cherokee Pipe Line Company elected are **John L. Kelly,** Continental Pipe Line Company, Ponca City, vice president and general manager, products pipe line division; **Ben D. Luety,** Cities Service Company, Bartlesville, Okla., vice

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"I needed a stopple on a high-pressure natural gas line. We had never made a hot tap before, and to shut down would have been too expensive. I called in a TOPAZ sales engineer and told him my problem. He specified the necessary equipment, supervised the preparation, and made the hot tap for me. No expensive equipment, no shutdown, and no unnecessary risks. That's what I call COMPLETE SERVICE!"

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100% Waterproof — made with top quality base fabric saturation-coated first and then coated with 6 coats of Neoprene Latex.
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president and general manager, crude oil pipe line division; **G. R. Preston,** Cities Service Company, vice president and treasurer; **F. B. Plank,** Cities Service Company, secretary; **John D. Morrow,** Continental Pipe Line Company, assistant secretary; **C. B. Wedum,** Cities Service Company, assistant secretary; and **R. E. Onstot,** Continental Oil Company, Ponca City, assistant treasurer.

Kygar, Luety and Preston also were elected to Cherokee Pipe Line Company's board of directors. Other directors are **T. A. van Griethuysen,** Continental Oil Company, Houston; **K. W. Brill,** Continental Oil Company, Oklahoma City; and **Harry Nelson,** Cities Service Company, Bartlesville.

•

R. L. Sanders, Ponca City, Okla., has been promoted to superintendent of **Continental Pipe Line Company's** Louisiana district, with headquarters at Lake Charles, La.

Formerly chief clerk for Continental Pipe Line Company, a subsidiary of Continental Oil Company, he replaces **Frank Beard,** who was recently transferred to Madison, Wis., as superintendent of the Madison and Amboy, Ill., petroleum terminals.

Harry A. Nester, Spokane, Wash., chief clerk for Yellowstone Pipe Line Company, an affiliate of Continental Oil Company, will succeed Sanders as chief clerk at Ponca City.

Sanders joined Continental Oil Company at Ponca City in 1951 and transferred to Continental Pipe Line Company offices there two years later. Nester joined Continental Pipe Line Company at Ponca City in 1948 and transferred to Salt Lake City four years later. He was named chief clerk for Yellowstone Pipe Line Company at Spokane last summer.

•

Charles E. Curry, general superintendent of transportation operations, has been elected vice president and director of **Sohio Pipe Line Company.** He was affiliated with the Kentucky Natural Gas Company before joining Sohio in 1944 as an engineer in the St. Louis office. Since that time he has been successively division engineer, division superintendent, senior superintendent, and on February 1, 1953 became the general superintendent of the Transportation department pipe line operations.

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J. W. Hargrove

B. P. Smith, Jr.

J. W. Hargrove has been elected vice president of **Texas Eastern Transmission Corporation** and **B. P. Smith, Jr.**, elected treasurer. Hargrove joined Texas Eastern in 1947, and was elected assistant secretary and assistant treasurer the next year. In 1950 he was elected secretary, and, in 1953, became secretary and treasurer. He will retain the title and duties of secretary.

Smith joined Texas Eastern in 1948 as general auditor, holding that position until his recent election. He was formerly an accountant and, later, assistant to the comptroller of Panhandle Eastern Pipe Line Company.

•

Standard Oil Company (Indiana) has made five new products pipe line appointments.

R. T. Scott named division superintendent of a new Chicago, Ill., division, is responsible for the operations and maintenance of the company's products pipeline facilities extending from Whiting, Ind., to Detroit, from Whiting to Indianapolis, Ind., and from Whiting to Dubuque, Iowa. His headquarters are located at 4811 South Harlem Avenue, Chicago.

M. T. Vance was named office manager of the new Chicago division, and **R. L. Clapper** was appointed division engineer.

N. F. Tietze became district superintendent of a new Spring Valley, Minn., products Pipe Line department district. He is responsible for the operations and maintenance of products pipeline facilities extending from Dubuque, Iowa, to Sauk Centre, Minn. **R. W. Johnson** was appointed division engineer for the Des Moines division, succeeding Tietze.

In the Chicago general office **W. L. Kelly** has been appointed supervisor of a new supply and transportation accounting division in the Comptroller's department.

Frank Sullivan has been named director of public relations for the **Southern California Gas Company**, Los Angeles. For the past year and a half, he has served the company as consultant.

F. A. McCanlies, assistant vice president, will become assistant director of public relations.

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Dependable S&J SWING LINE ASSEMBLY

Fig. ST-235

Swing line equipment for petroleum storage tanks can only be as efficient and dependable in operation as its design and manufacture make it. You can be assured that Shand & Jurs Swing Line assemblies possess that top notch QUALITY that set them head and shoulders above the rest. Consider these features of S&J's Swing Line Assemblies that provide long life operation and greater dependability under all weather and operating conditions:

The S&J Double Elbow Swing Joint, Fig. ST-235, is designed for mounting on the tank shell only. Settling or shifting of the tank bottom cannot affect its free and easy swing. The two elbows are held together by a spring loaded rod and tension can be adjusted. The swivel elbow is supported by a thrust bearing which is tied to the tank shell by telescoping supports that facilitate installation. Telescoping supports are supplied only when specified.

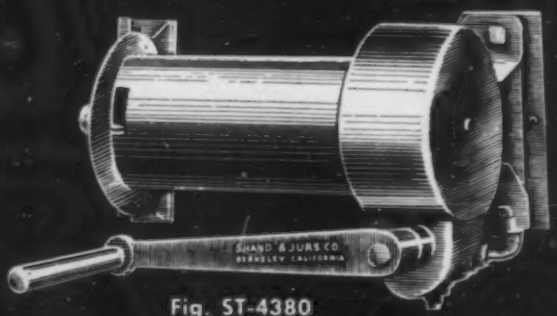

Fig. ST-4380

The S&J Cable Winch, Fig. ST-4380, utilizes machine cut, anti back-lash gears which run in an oil bath. The handle is designed to provide maximum mechanical advantage with minimum effort.

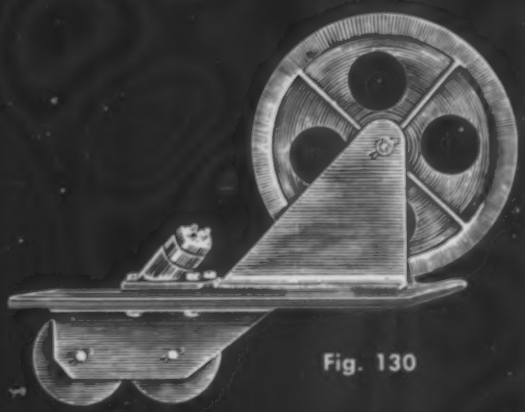

Fig. 130

The design of the S&J Cable Sheave Bracket, Fig. 130, assures proper alignment of the plow steel cable passing through the tank roof and over the exterior sheave. Also available are S&J Gas Tight Cable Sheave Cases which provide an oil seal for moderate tank pressures.

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What's Happening

AMONG SERVICE AND SUPPLY MEN

Engvall and Haverstick Named To New Posts at De Laval

Harry Engvall, former chief engineer of the Turbine and Gear departments of the De Laval Steam Turbine Company, Trenton, N.J., has been named executive engineer. He joined the company in 1924, a year after coming to this country from Sweden, and since that time has been assistant chief engineer and chief engineer of the Helical Gear department and chief engineer of the Turbine and Gear departments. Since 1943 he has been in charge of marine turbine design.

John S. Haverstick, who succeeded Engvall as chief engineer, joined De Laval in 1938 and was made chief research engineer in 1953. Formerly he was assistant chief engineer of the Gas Turbine department.

Snider Named Sales Assistant At Gar Wood Industries

C. W. Snider has been appointed assistant to the director of sales for Gar Wood Industries. He will assist E. B. Hill, vice president and director of sales, in the administration of sales and marketing functions for all Gar Wood products.

C. W. Snider

Snider has been assistant sales manager of Gar Wood truck equipment since 1953, when he joined the company. Before that, he was assistant to the president of Sparks-Withington Company, Jackson, Mich., for five years. He also was in business for himself a number of years which included a period of manufacturing wire specialties and ten years in the brokerage business.

Tube Turns of Louisville Reorganizes Sales Department

Tube Turns, of Louisville, Ky., division of the National Cylinder Gas Company, Chicago, has announced the reorganization of the company's Sales department.

Major areas of responsibility are now being handled by:

John E. Chumbley, Jr., assistant general sales manager, who administers sales policies and sales of welding fittings and flanges everywhere within the U. S., and supervises forging sales.

Thomas H. Pike, Jr., merchandising manager, who supervises merchandising activities of the Louisville general sales office, and has supervision of the Houston and Los Angeles plants and the Engineering Service division.

Jack W. Green, executive assistant, who has charge of all sales policies and projects for Canada, foreign sales, conventions, shows and exhibits.

Charles F. Morris, who is sales manager of the Forgings division.

Lincoln D. Hall, formerly manager of the Tulsa office, who has become assistant sales manager and now administers sales policies and sales in the Tulsa, Houston and West Coast territories.

Elmer H. Dilley, who is manager of the general sales office and supervises the handling of inquiries and quotations, registration and entry of orders, special fittings, inventories and inventory control, order scheduling and other functions.

H. Dewey Gass, Jr., who is manager of the Order Service department and works closely with Dilley.

Dan R. Cheyney, who is assistant manager of the Engineering Service division, in charge of alloys.

Jack D. Tolliver, who is assistant manager of the Engineering department, in charge of pipe line business.

ON-THE-SPOT SERVICE ...Day by DAY!

Whether your job is done in the yard or in the field you get the experience of an S. D. Day man with his help and assistance — part of the follow-up service you get when you "DEAL WITH DAY."

S. D. Day Company is National Distributor for the Ruberoid Co. pipe line asbestos felt, Gulf Coast Distributor for Pittsburgh Coke & Chemical Co. hot and cold applied coal tar coatings and American Coating & Supply Company's fieldjointer.

The ability of RUBEROID asbestos felt and PITT-CHEM coal tar enamels to meet and withstand the severe requirements of pipe line service against corrosion adds years to the useful life of pipelines. Both of these products are stocked in Houston for immediate shipment.

Engineering counsel, literature and prices are furnished through our Houston Office.

The Pipeliner's Friend says,
"Formula 291 gives skin protection for those working where fumes may be toxic."

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Fluor Opens New Research Center

Hosts at the Fluor open house at the new research headquarters at Whittier, Calif., were (left to right) J. S. Fluor, president; W. R. Hainsworth, vice president in charge of research; F. E. Fisher, secretary-treasurer; C. L. Blohm, manager of research; M. A. Ellsworth, vice president and director of sales; and J. R. Fluor, executive vice president. The research building itself has 17,000 square feet of office and laboratory space plus two acres devoted exclusively to pilot plant construction and operation.

Cochran Elected President Of Chapman Valve Company

Ernest Cochran has been elected president and general manager of The Chapman Valve Manufacturing Company. He succeeds John J. Duggan who recently died.

Cochran joined the Chapman Company in 1916 and has served as manager of sales and engineering, vice president, and, since 1954, executive vice president. He has served on the board of directors since 1943.

Harold G. Dickey, president of Moore Drop Forging Company, Springfield, Mass., was elected to the directorate at the same time.

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Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet.

GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug-fitting, large, removable top, handy non-leaking push-button faucet. GOTT Water Cans for handy field use. Your supply store has them, get one today!

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Insist on the Genuine

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RCA to Build Microwave System For Utah Power and Light

Engineering Products Division, Radio Corporation of America, has announced that it has contracted for installation of a multi-hop microwave radio relay system which will link the Utah Power and Light Company at Salt Lake City with hydro-electric plants at four Utah locations.

The system will provide voice, telemetering and supervisory control circuits connecting the utility's terminal substation west of Salt Lake City with power plants at Cutler, Grace, Oneida, and Riverdale, Utah.

B-I-F Industries Subsidiary Changes Name to B-I-F Pacific

B-I-F Industries, Inc. of Providence, R.I., announces that its West Coast affiliate, Builders-Pacific, Inc., has changed its name to B-I-F Pacific, Inc., West Coast Division of B-I-F Industries, Inc. Offices are in San Francisco, Los Angeles and Phoenix, Ariz.

The division will continue as sales and service representative of Builders-Providence, Inc., Omega Machine Company, and Proportioneers, Inc. in northern California and Arizona and as representatives of Builders-Providence and Omega in southern California.

Ben A. Hughes

A. F. Vogler

PLICO Adds Three Men To Midcontinent Staff

Pipeline Coating & Engineering Company, Inc. has added three men to its staff in Houston. They are Ben A. Hughes, Houston office manager, a graduate of Industrial Training Institute in Chicago. He is experienced in construction work as well as in electronics, working five years as electronics technician and three years in construction sales.

D. E. Hughes

A. F. (Gus) Vogler, appointed sales engineer, has had more than ten years' experience in pipeline construction and operation. He was recently sales manager of a cathodic protection firm.

D. E. Hughes, now district representative, joined PLICO after five years' experience in sales and service of oil field and pipe line equipment.

The Houston office will stock a full line of company products, bringing PLICO engineering systems closer to the Gulf Coast pipe line industry.

Rockwell Manufacturing Company Will Build New Kentucky Plant

Rockwell Manufacturing Company has announced the selection of Russellville, Ky., as the site for a new plant expected to go into operation in mid-1955.

The plant, to be located on a 30-acre site, will have from 80,000 to 100,000 square feet of floor space and is expected to cost from $800,000 to $1 million exclusive of production equipment. Construction will start in early January and initial occupancy is scheduled during May.

Russellville, located in the south central portion of Kentucky, is the sixteenth community in which Rockwell Manufacturing Company will have plant facilities.

Koppers Company Appoints Marks Products Manager

Wilson F. Marks has been appointed product manager, Cold Applied Coatings Section, Tar Products Division of Koppers Company, Inc.

For four years, Marks was sales manager with RCA Victor Distributing Corporation, and, before joining Koppers Company, was field sales manager for Universal-Rundle Corporation of New Castle, Penn.

WISCONSIN-POWERED

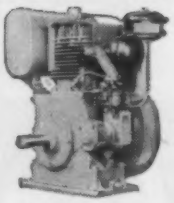
Gathering Pump Unit Weathers 11-Inch Rain Storm in Louisiana Delta Country Oil Field

Back in the Louisiana Terrebonne Parish delta country, Wisconsin-powered Gathering Pump Units take a terrific beating from the elements.

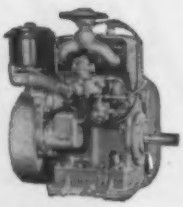
Not long ago two Harley Sales Company service engineers, while making their rounds in this oil field, had occasion to check the platform-mounted installation shown above, on which a Wisconsin Model VG4D Heavy-Duty Air-Cooled Engine was operating with the canopy housing removed, leaving the engine fully exposed to the weather.

Shortly after starting the engine a 70 m.p.h. gale broke, dumping 11 inches of rain while the Wisconsin-powered gathering pump began the transfer of 1000 bbls. of oil. The next morning the tanks were empty and the engine no worse for the ordeal . . . again demonstrating the all-weather dependability of Wisconsin Air-Cooled Engines.

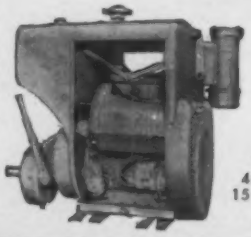
You can't do better than to specify "Wisconsin Engine Power" for your oil field utility units.



4-cycle single cylinder 3 to 9 hp.



2-cylinder models 7 to 15 hp.



V-type 4-cylinder 15 to 36 hp.

WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
619 SOUTH MAIN STREET • TULSA, OKLAHOMA
3420 McKINNEY AVENUE • HOUSTON, TEXAS
505 SOUTH MAIN STREET • WICHITA, KANSAS
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS

A 8097-½-1

Rockwell Division Reorganizes Midwestern Sales Organization

C. K. Madison

Roy R. Bush

W. R. McLaughlin

Rockwell Manufacturing Company's Meter and Valve division is reorganizing its Midwestern sales set-up to provide increased service to customers throughout that section.

Carl K. Madison, Midwestern regional manager, has been promoted to vice president in charge of new product sales for the division, and the Midwestern sales region has been divided into a new Southwestern and a smaller Midwestern region.

Roy R. Bush, Tulsa, district manager, has been named Midwestern regional manager with headquarters at Tulsa. W. R. McLaughlin, manager of the Dallas office, becomes Southwestern regional manager with headquarters at Dallas.

Madison joined Rockwell in 1929 as a sales engineer in the Houston district. He became manager of the Houston district in 1944 and was named Midwestern regional manager in 1951.

Bush joined the Rockwell sales staff in the Tulsa area in 1934. He became special sales representative for the Nordstrom Valve division some years later and was appointed sales manager of oil field products in 1951 with headquarters in Pittsburgh. In 1952 he returned to Tulsa as district manager.

McLaughlin joined the company in 1934 as a sales engineer in Dallas and later served as sales manager of the gas division in Pittsburgh and special sales representative in the Southern region. In 1952 he was named manager of the Dallas office.

Stuart Land Named Controller Of C-R-C Engineering Company

Stuart Land has been named controller of C-R-C Engineering Company of Houston. He will also serve as controller of C-R-C Engineering of Canada, Ltd.

Assistant controller for 15 months, Land was formerly associated with Crown Central Petroleum Corporation in Houston and Magnolia Petroleum Company and Sun Pipeline Company in Beaumont.

Stuart Land

Du Mont Laboratories Makes Two New Division Assignments

Irving G. Rosenberg has been assigned executive responsibility for direction of the Communication Products Division of Allen B. Du Mont Laboratories, Inc., Clifton, N. J. As vice president, government and tubes, he will also continue to direct the government manufacturing and cathode-ray tube divisions.

Robert E. Kessler, former assistant manager of the Communication Products division, has been named manager. He will intensify activity in the development, production, and sale of high-power television transmitting and studio equipment.

Kessler is one of the television and electronic industry's pioneer executives and engineers. He has been with Du Mont since 1936, and was the ninth full-time employe to be hired by Dr. Allen B. Du Mont in the early years of the electronics company.

The Communication Products division manufactures and distributes television transmitters, cameras and studio equipment and mobile radio transmitting and receiving equipment.

STURDYBILT PREFABRICATED HOUSES

N W E S

Wherever you need housing . . .

Because STURDYBILT houses are prefabricated they can be moved anywhere a truck can go. They can be erected in a hurry, and dismantled and moved again when necessary. You have a large variety of designs to choose from — either residences or industrial buildings. Wherever you need housing — investigate STURDYBILT first.

MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF CURTIS WOODWORK, JOHNS-MANVILLE BUILDING MATERIALS

STURDYBILT PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

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STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

What's New in Equipment

for the Pipe Line Industry

Precision Relief Valves

A new type precision relief valve has been developed and is now being made available to the refining, natural gasoline and petrochemical industries for applications where no leakage can be tolerated after the valve relieves and reseats. This new valve incorporates a unique seating principle using a "soft seat" made of Teflon. The shape of the seating disc forces the line pressure to work for the valve rather than against it. This principle gives the valve the ability to seal itself absolutely after relieving, and allows it to relieve or to be check popped many times without the expense of loss of time required to relap a metal to metal contact seat.

One outstanding maintenance feature of this new valve is its simple construction which allows the inexpensive seat to be replaced quickly should it become necessary.

These new valves, products of Anderson, Greenwood & Company, are available with inlet sizes up to 1 inch and with set pressures up to 6000 psi for gas trim and 15,000 psi for hydraulic trim.

For more data circle **No. E1** on Readers' Service Card, last page this issue.

Utility Ditcher

The recently introduced Gar Wood-Buckeye model 315 pipe line and utility ditcher has established a record of trench excavation through solid coral rock, technically called "oolite," in Coral Gables, Fla., where four Buckeye ditchers have been excavating trench for 300,000 feet of sanitary sewerage lines.

The newly introduced Buckeye 315 wheel-type ditcher (shown excavating through a Coral Gables alley) has been averaging 1700 feet of trench 24 inches wide and from four feet to 6 feet deep each day through the coral rock underlaying the city to within inches of the surface. This performance, coupled with that of three Buckeye ladder-type ditchers, two special model 407 machines for trench from 6 feet to 9 feet deep and a special model 160 for trench from 9 feet to 16 feet deep, has enabled the contractor to average 3000 feet of trench a day.

For more data circle **No. E2** on Readers' Service Card, last page this issue.

Low Hydrogen Electrode

Through its exhibit facilities at the National Metal Exposition, Alloy Rods Company unveiled for a new concept of a low hydrogen electrode. This new electrode is being marketed under the trade name of ATOM•ARC and is available in the strength levels and chemistry of the 7016, 8016, 9016, 10016, 12016 AWS grades.

For the first time, iron powder has been incorporated into the coating of a low hydrogen electrode, making possible the use of higher welding currents with either AC or DC. These higher currents increase the number of pounds of weld metal deposited per hour. Deposition efficiency is greatly increased since the iron powder contained in the coating serves as an additional source of weld metal. Savings of $61.25 per 100 pounds of deposited weld metal have been effected in comparison tests with ordinary 7016 electrodes.

ATOM•ARC Electrodes are packaged in a 50-pound hermetically sealed, all metal container which assures clean, moisture free electrodes when delivered. They will resist detrimental moisture pickup for ten days after the container has been opened.

Starting porosity common to ordinary low hydrogen electrodes is eliminated when using ATOM•ARC. ATOM•ARC weld metal is X-ray sound and has better impact resistance than ordinary low hydrogen electrodes. Charpy V-notch impact values range up to 178 foot pounds at room temperature.

For more data circle **No. E3** on Readers' Service Card, last page this issue.

Save time! Keep informed! Circle numbers on Readers' Service Cards, last page this issue.

Stop Corrosion!

WITH *Harco* CATHODIC PROTECTION SYSTEMS

Industry's No. 1 Enemy can be stopped by HARCO.

Now there is a "police force" ready to help you in stopping thief corrosion. Harco engineers are defeating the ravages of electrolytic corrosion of underground and underwater piping.

HARCO JOB-ENGINEERED SYSTEMS provide necessary testing, drawings, materials, installation and maintenance.

HARCO INSTALLATION CONTRACTING is completed to customers specifications and covers as much of total job as required. HARCO will assist in evaluation and solution of your particular problems.

Stop the thief Corrosion Now!
Specify HARCO . . . FIRST IN THE FIELD OF CATHODIC PROTECTION.

Write today for catalog or call MOntrose 2-2080

Natural Gas Pumping Station Utilizes Harco-Engineered Cathodic Protective System to Eliminate Corrosion in Underground Lines

THE *Harco* CORPORATION *Cathodic Protection Division*

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6169-HC

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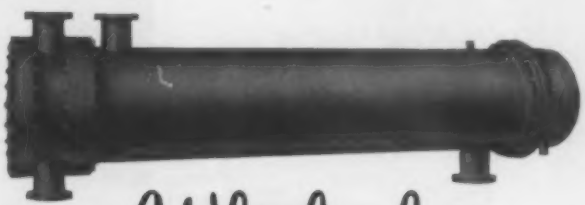
NOTE ON COMPRESSOR MAINTENANCE

Keep 'Em Cool!

The efficient operation of your compressors — in fact, their *life* — depends on the removal of waste heat from lubricating oil and water cooling systems. The Whitlock Type SG Cooler is specially designed for such service. It is small yet capable of handling relatively high heat loads, and its standardized design means low cost and prompt shipment.

The cooler is two-pass in design and properly baffled to develop high fluid velocities and subsequent high heat transfer rates, with minimum pressure drop. Its non-ferrous tube bundle, cast iron channel and steel pipe shell mean long, trouble-free equipment life even under severe operating conditions. Bulletin 122 gives you the whole story on Whitlock Lube Oil and Jacket Water Coolers. For your copy, just fill in and return the coupon today.



Whitlock

WHITLOCK Designs and builds: bends, coils, condensers, coolers, heat exchangers, heaters, piping, pressure vessels, receivers, reboilers.

THE WHITLOCK MANUFACTURING CO.
98 South Street, Hartford 10, Conn.

☐ Please send Bulletin 122 describing Whitlock Lube Oil and Jacket Water Cooler — Type SG.

Name .....

Title .....

Company .....

Address .....

For more data on advertised products, use Readers' Service Cards, last page.

TEMPORARY STRAINERS

MAC-IRON SANDUSKY OHIO

Established 1901

Made by a skilled mechanic and not by "just some guy with a torch."

REVOLUTIONARY CONSTRUCTION

Smooth, efficient contours . . . no weld "blob" around edge of ring. The flange is precision rabbeted into the ring joint gasket making deformation at that point impossible.

MAC-IRON offers a complete listing of line and temporary strainers. The latter of woven wire, perforated basket and conical . . . all for use with raised face, and ring joint flanges.

A large stock on hand is maintained; special strainers made to specification. Write direct for a catalog and complete information.

The Mack Iron Works Company

Warren and Water Sts. Sandusky, O.

WE STOP What You Start

TIME INTERVAL CONTROL

ROACH TIMER Model TYC 101

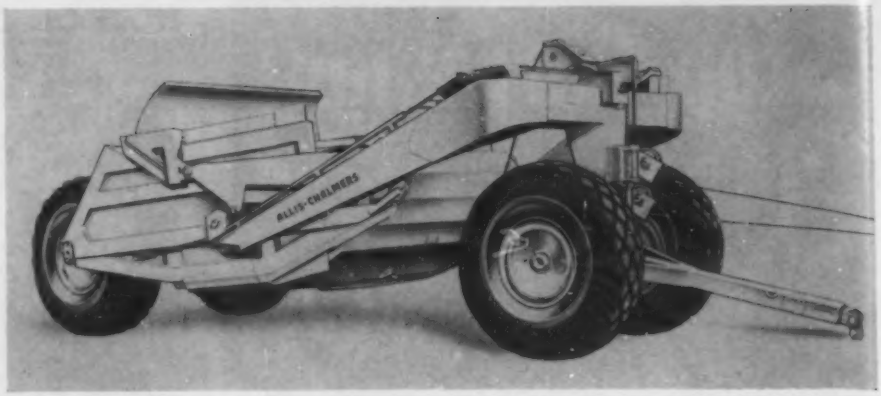
Spring-wound, 24-hour movement (which cannot be overwound) actuates mercury switch. Designed for simplest trouble-free operation. Enclosed in weather-tight housing.

WRITE FOR NEW BULLETIN #101

ROACH

EQUIPMENT COMPANY

BOX 1067 TULSA, OKLA.



Shovel-Cranes

Introduction of a new one-half yard machine with "big rig features" has been announced by Link-Belt Speeder Corporation. The new machine is the LS-58 designed with power hydraulic "Speed-o-Matic" controls to bring about smooth response with easy fingertip control. Upper machinery is built to handle the faster operating cycles of Speed-o-Matic control and up to 55 net usable horsepower. Alloy cast iron clutch shells, with superior friction qualities permit longer lining life. All shafts are splined and the larger diameter, two-shoe internal expanding Speed-o-Matic clutches are easily accessible.

The all-welded crawler base on the LS-58 is stress-relieved for maximum strength and resistance to impact. A 53-inch diameter, double-flanged turntable provides stability and eliminates center pivot up-pull. The rollers and roller path are precision machined for true rolling action of the conical hook rollers.

Three crawler lowers are offered. The standard lower is 10 feet 3 inches in over-all length; the intermediate lower, 11 feet; and the long-wide lower has 12 feet 1 inch over-all length. Travel steer jaw clutches are enclosed within the lower frame. Bevel gears run in oil. Six single tread track rollers and two carrier rollers help maintain proper track alignment.

(This item supplements Link-Belt Speeder Corporation, Division of Link-Belt Company data on page 2900 of the Composite Catalog, 20th Edition.)

For more data circle **No. E4** on Readers' Service Card, last page this issue.

Pull-Type Scraper

Allis-Chalmers Manufacturing Company, Tractor division has added a 15 cubic yard struck, 19 cubic yards heaped, capacity rubber-tired four-wheel scraper to its line of pull-type scrapers. The new unit is cable-controlled and features positive forced ejection. It provides a 9 foot 8-inch wide cut with its carbon steel heat-treated offset type cutting edge.

Over-all length of Model 315 is 33 feet 5-inches and the width is 11 feet 6¾ inches. The over-all height is 8 feet 8 inches with blade on the ground, and 9 feet 2 inches when bowl is raised. Rear bowl ground clearance is 20½ inches and front axle clearance 29 inches when 21.00x24 tires (standard for the 315) are used. Approximate shipping weight with the 21.00x24 tires is 25,850 pounds.

(This item supplements Allis-Chalmers Manufacturing Company, Tractor Division, data on pages 179-180 of the Composite Catalog, 20th Edition.)

For more data circle **No. E5** on Readers' Service Card, last page this issue.

Circle numbers on Readers' Service Cards, last page this issue.

New Catalogs and Equipment Literature

Engine Generator Sets

A new bulletin on Le Roi custom built engine-generator sets is now available. The bulletin describes seven engine models from 60 to 675 horsepower with generators capable of producing from 50 to 350 KW. Features described include alternate fuel systems which permit the use of natural gas, LPG, gasoline and gas-gasoline or sludge gas fuels; a choice of radiator, heat exchanger or city water cooling systems; electric, automatic or engine starting; mechanical, full hydraulic or semi-hydraulic governors; and oil pressure and water temperature safety switches. The literature also shows how these engine-generator sets are used for continuous or standby power in municipal, governmental, petroleum and general industrial installations.

To get a copy, circle **No. E6** on Readers' Service Card, last page this issue.

Wrench for Socket Screws

A new wrench for socket screws has been patented by the LC Wrench Company that really speeds up the task of wrenching socket screws as compared to the old hex key, piece of pipe or hammer.

The LC wrench line consists of 16 sizes and is actuated by any of the large variety of standard square drivers, one-fourth-inch, three-eighths-inch and one-half-inch. No more need for making up special keys for different places.

To get a copy, circle **No. E7** on Readers' Service Card, last page this issue.

Centrifugal Pumps

Industrial Filter & Pump Manufacturing Company has issued a new eight-page bulletin on its line of vulcanized-rubber-lined centrifugal pumps and stainless steel and cast steel centrifugal pumps. Besides giving detail specifications and describing the design and construction features which, the company claims, offer superior performance, this bulletin includes performance curves for the various models.

To get a copy, circle **No. E8** on Readers' Service Card, last page this issue.

Liner Packing Replacements

By paying attention to certain critical points when installing pump liners, liner packing replacements can be substantially reduced. The National Supply Company has prepared a tip sheet showing exactly where to focus attention to get maximum life from liner packing.

To get a copy, circle **No. E9** on Readers' Service Card, last page this issue.

Instrument Bulletin

Precision Radiation Instruments, Inc., has published a booklet on its quality instruments for locating uranium and metals and for industrial, laboratory and medical use. There is a guide to instrument selection as well as descriptions and specifications of the instruments. These include the "royal scintillator," preamplifier, lead shield, portable scintillation counter, "drill hole" geiger counter, metal locator, and others.

To get a copy, circle **No. E10** on Readers' Service Card, last page this issue.

ARCCO
ARCCO CANNON NEVER-DRY PEN
Writes for Months
REPLACES OTHER MAKES • USES REGULAR INKS
Regardless of pulsations or other causes of ink failures this new Never-Dry Pen will make clean and complete records. Ink supply lasts for several months without refilling reservoir. Capillary tube from ink bottle placed in instrument case feeds pen with continuous flow. Closed system sealed from atmosphere prevents clogging and dirt accumulation.
Weight of pen is constant at all times thus insuring extreme accuracy. No slopping or dripping. Stainless steel construction—no corrosion. When ordering, specify make and type of recording instrument.
AMERICAN
RECORDING CHART CO.
3113 E. 11th St. • Los Angeles 23, Calif.
$6.00 each Net
Send for quantity prices
SEND FOR BULLETIN NO. 115

See Composite and Refinery Catalogs, or Write for Specifications Folder

FLEET-LINE

PIPE SADDLES AND REDUCERS

Nozzle sizes from ¼" to 24"

ASTM A234

Also for pressure vessel heads

Nominal pipe sizes 1" to 30"

ASA B16.9
ASTM A234

Special sizes and lengths. Schedules 10 to 160

Immediate Delivery

STEEL FORGINGS, Inc.

P. O. Box 276K • Shreveport, La.

Foot of Fannin Street

NEW! Write for Bulletin.

Patented

PIPELINE VENTS AND MARKERS

FLEET-LINE CO.

P. O. BOX 276K

SHREVEPORT, LOUISIANA

29 Years Experience Behind Every Pipeline Job

SINCE 1926

Advertisers' Index

• Dot preceding name of advertiser indicates that detailed data on products and services of the firm will be found in current 20th (1953-54) edition of The Composite Catalog of Oil Field and Pipe Line Equipment.

A

Allen Cathodic Protection Co. 90
• Allis-Chalmers Manufacturing Co. 70-71
Alston Manufacturing Co. 98b
• American Recording Chart Co. 111
American Telephone & Telegraph Co. 69
Armco Steel Corp. 81
Associated Pipe Line Contractors 87

B

The J. B. Beaird Co. 35
• Bethlehem Steel Co. 30
Brakesol, Inc. 105b

C

Caterpillar Tractor Co. 7
The Cleveland Trencher Co. 99a
Collins Construction Co. 97
Columbia-Geneva Steel Division
United States Steel Corp. 14
• Crane Co. 6

D

S. D. Day Co. 104
• Dollinger Corp. 15
E. I. du Pont de Nemours & Co. 36

E

The Electric Controller & Mfg. Co. 34

F

Fleet-Line Co. 112b
• Flexitallic Gasket Co. 27

G

• Gaso Pump & Burner Mfg. Co. 116
Gilbert & Barker Manufacturing Co. 24
• H. P. Gott Manufacturing Co. 105a
• Graver Tank & Mfg. Co. 85
Gunite Concrete & Construction Co. 102d
• Gustin-Bacon Manufacturing Co. 13

H

Hammond Iron Works 12
The Harco Corp. 109a

I

• Ingersoll-Rand Co. 17
Insley Manufacturing Corp. 93

J

• Jet-Lube, Inc. 92
• Johns-Manville 26
• Jones & Laughlin Steel Corp.
Supply Division 25
• Joy Manufacturing Co. 79

K

Kaiser Steel Corp. 32
Kewanee-Ross Corp. 16
• Kinzbach Tool Co. 91

L

Layne & Bowler Pump Co. 8
Lowell Wrench Co. 101b
• Lufkin Foundry & Machine Co. 9

M

The Mack Iron Works Co. 110a
Mavor-Kelly Co. 80b
Mayes Bros. Inc. 76
Midwestern Engine & Equipment Co. 11
• Mixing Equipment Co. 29

N

National Tube Division
United States Steel Corp. 14
Newport Steel Corp. 77

O

• Oil Well Supply Division
United States Steel Corp. 5

P

Tod Pazdral Pipeline Specialties 100
• Pelican Supply Co. 112d
Pipe Line Anode Corp. 102a
Pittsburgh Coke & Chemical Co. 31

R

Read Standard Corp. 21
The Ridge Tool Co. 20
Roach Equipment Co. 110b
Rochester Manufacturing Co. 80a
• Rockwell Manufacturing Co. 22-23

S

H. M. Sawyer & Son Co. 101a
Shand & Jurs Co. 103
• M. B. Skinner Co. 102b
• A. O. Smith Corp. 2
Ray L. Smith Co. 112c
Somerville Construction Co. 105c
• Southern Mill & Manufacturing Co. 107
• Steel Forgings, Inc. 112a

T

• Taylor Instrument Companies 18
• Thornhill-Craver Co. 33
• Tretolite Co. 28
• Tube-Kote, Inc. 88
Tulsa Gauge & Instrument Co. 102c

U

• Union Wire Rope Corp. 37
United States Steel Corp. 5, 14
United States Steel Export Co. 14

V

Van Der Horst Corp. of America 78
J. H. H. Voss Co. 99b

W

• W-K-M Manufacturing Co. 115
Walworth Co. 75
Weston Electrical Instrument Corp. 89
The Whitlock Manufacturing Co. 109b
• T. D. Williamson, Inc. 86
• Wisconsin Motor Corp. 106
• Worthington Corp. 19

Y

The Youngstown Sheet & Tube Co. 10

Z

H. B. Zachry Co. 98a

NOTICE: Specify PELCO Welding Saddles

No change except the corporate name. We still have the same ownership, same management, same address, same telephone, and use the same 45 years of experience to render the same service under the same trade name—"PELCO."

PELICAN SUPPLY CO. INC.

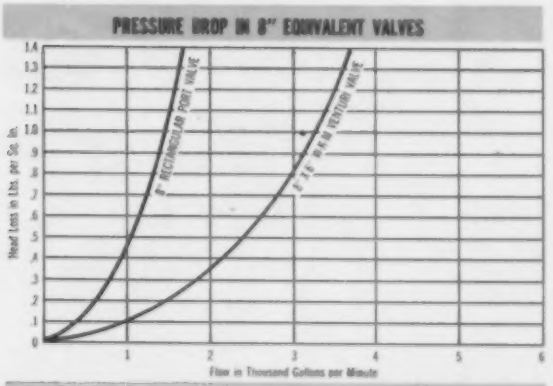
P. O. Drawer 1108 Shreveport (84), La.

SEE YOUR NEAREST SUPPLY HOUSE

AN ENGINEER LOOKS AT W-K-M VALVES

ON PRESSURE DROP

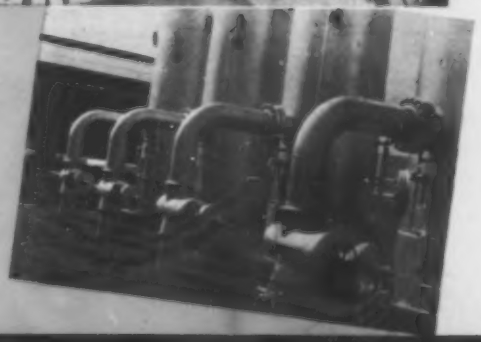
IN W-K-M ROUND OPENING VENTURI VALVES AND RECTANGULAR OPENING PLUG VALVES


PRESSURE DROP IN 8" EQUIVALENT VALVES
Head Loss in Lbs. per Sq. In.
8" RECTANGULAR PORT VALVE
8" 1/8" ROUND VENTURI VALVE
Flow in Thousand Gallons per Minute

You get 21% **less** pressure drop in W-K-M Venturi Valves than in rectangular opening plug valves as shown by the pressure drop chart at right. **And,** in equivalent sizes, W-K-M Venturis cost the same or less than plug valves.

You're way ahead when you specify W-K-M — not only do you get far greater transmission efficiency, but you get leverlock operation, positive seal on both sides, spot lubrication at seat, and other advantages, all of which have made W-K-M Valves first on the world's major pipelines.

W-K-M Valves



W-K-M MANUFACTURING COMPANY, INC.

A SUBSIDIARY OF A.C.F. INDUSTRIES INCORPORATED

P. O. Box 2117, Houston 1, Texas Los Angeles, California

Export Office: 45 Rockefeller Plaza, New York, N. Y.

GASO DISTRIBUTORS . . .
CHOSEN WITH CARE TO
take care of your needs

Fig. 2562—Gaso economy in a large-capacity unit especially adapted to gathering and main line service.

Gaso distributors, listed below, combine a first-hand knowledge of local conditions and requirements with a practical knowledge of the Gaso line. They are good people to know, helpful people to contact for a sound solution of any problem involving portable pumping units.

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EXPORT OFFICE: 149 Broadway, New York

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W. L. SOMNER COMPANY, Shreveport, Louisiana
Tinsley, Mississippi • Brookhaven, Mississippi • Odessa, Texas
POWER PUMPS, INC., Long Beach, Calif.
PEDDLERS, INC., Houston, Texas
NORTEX ENGINE & EQUIPMENT CO., Wichita Falls, Texas
LUFKIN FOUNDRY & MACHINE CO., Casper, Wyoming

GASO PUMPS
for every oil industry need